



**Hudson River PCBs Site
Baseline Monitoring Report
Data Summary Report for 2007**

Prepared for:
**General Electric Company
Albany, NY**

Prepared by:
**Quantitative Environmental Analysis, LLC
Glens Falls, NY**

In conjunction with:
**Environmental Standards, Inc.
Valley Forge, PA**

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**Job Number:
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List of Acronyms

ASTM	American Society for Testing and Materials
BMP	Baseline Monitoring Program
BMPSD	Baseline Monitoring Program Scoping Document
CAM	Corrective Action Memorandums
cfs	Cubic Feet per Second
COC	Chain-of-Custody
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DQOs	Data Quality Objectives
DSR	Data Summary Report
DVM	Data Verification Module
EDDs	Electronic Data Deliverables

EDI	Equal Discharge Increment
ESI	Environmental Standards, Inc.
GE	General Electric Company
GPS	Global Positioning System
HRM	Hudson River Mile
HRRM	Hudson River Reference Material
LCS	Laboratory Control Spike
LDs	Laboratory Duplicates
MADIS	Multiple Aliquot Depth Integrating Sampler
MDL	Method Detection Limit
mGBM	Modified Green Bay Congener Method
MS	Matrix Spikes
MSDs	Matrix Spike Duplicates
NEA	Northeast Analytical Laboratory, Inc.
NRCC	Northeast Regional Climate Center at Cornell University
NYSDEC	New York State Department of Environmental Conservation
PCB	Polychlorinated Biphenyl
PCRDMP	Post-Construction Remnant Deposit Monitoring Program
PE Sample	Performance Evaluation Sample
POC	Particulate Organic Carbon
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QDQ	Qualitative Data Quality
QEA	Quantitative Environmental Analysis, LLC
RD AOC	Hudson River Remedial Design and Cost Recovery
RM	River Mile
ROD	Record of Decision
RPD	Relative Percent Difference
RPS	Resuspension Performance Standards
SDGs	Sample Delivery Groups
SOP	Standard Operating Procedures

STL	Severn Trent Laboratories
TAL	Target Analyte List
TID	Thompson Island Dam
TSS	Total Suspended Solids
EPA	United States Environmental Protection Agency
USGS	United States Geologic Survey

SECTION 1 INTRODUCTION

1.1 BACKGROUND

This annual data summary report (DSR) for the 2007 Baseline Monitoring Program (BMP) has been prepared on behalf of General Electric Company (GE) by Quantitative Environmental Analysis, LLC (QEA), in conjunction with Environmental Standards, Inc. (ESI). The purpose of this report is to document the field and laboratory work performed to complete the BMP in 2007, report the data, and to present the results of the associated data quality assessment.

The 2007 BMP was conducted under the Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery (RD AOC), effective August 18, 2003 (Index No.CERCLA-02-2003-2027; United States Environmental Protection Agency [EPA] and GE 2003), as part of the remedial design to implement the February 2002 Record of Decision (ROD) for the Hudson River PCBs Site issued by EPA (EPA 2002). The overall goals and scope of the BMP are defined in the Baseline Monitoring Program Scoping Document (BMPSD; QEA 2003), which was attached to the RD AOC. The BMP entails the routine collection and analysis of water and fish samples, as well as the performance of several special studies to support the remedial design. The methods and data quality objectives (DQOs) of the program are detailed in the BMP Quality Assurance Project Plan (QAPP; QEA and ESI 2004), which was approved by EPA on May 21, 2004.

1.2 REPORT OBJECTIVES

The objective of this DSR is to document the BMP activities completed in 2007 and to present the resulting data. Data interpretation efforts in this report are limited to assessing data quality and usability. The QAPP specifies that the annual report is to contain the following information: “The DSR will fully document the calendar year’s work including a summary of

the work performed, a tabulation of results, field notes, processing data, chain-of-custody (COC) forms (this information is incorporated into lab analytical data packages), copies of laboratory audits, data validation results, copies of laboratory reports, and a CD version of the project database”.

1.3 REPORT ORGANIZATION

This report is divided into ten sections that summarize the BMP field and lab activities for 2007. Section 1 includes the introduction and objectives. Section 2 provides a summary of the methods followed during the BMP water program, fish program, and special studies. Section 3 summarizes the quality assurance/quality control (QA/QC) methods used for the 2007 BMP. Sections 4, 5, and 6 present the results of the water program, fish program, and special studies, respectively. Section 7 presents the results of the portion of the BMP that was performed to satisfy the requirements of the Post-Construction Remnant Deposit Monitoring Program (PCRDMP; QEA 2000). Section 8 presents an assessment of data quality. Section 9 gives an overall summary of 2007 BMP activities. Section 10 contains the references. A total of seven appendices are included that provide documentation for the various field, laboratory, and data validation activities.

SECTION 2 METHODS

2.1 ROUTINE WATER SAMPLING PROGRAM

Routine water sampling was conducted at stations in the Upper and Lower Hudson River and in the Mohawk River (Figure 2-1). A summary of the sampling schedule is presented in Table 2-1. Sampling was performed weekly at the following six stations:

- Bakers Falls (River Mile [RM] 197.0);
- Rogers Island (RM 194.2);
- Thompson Island (RM 187.5);
- Schuylerville (RM 181.4);
- Stillwater (RM 168.4); and
- Waterford (RM 156).

Bakers Falls and Rogers Island are considered background monitoring stations. It is anticipated that the remaining stations will be far-field monitoring stations during dredging. Data collected at these stations during remediation will be assessed to determine achievement of the resuspension performance standards (RPS; EPA 2004).

2.1.1 Sample Collection Procedures

Water column samples were collected on a weekly basis in accordance with the standard operating procedures (SOP) specified in Appendix 1 of the QAPP (SOP for Weekly Water Column Sampling; QEA and ESI 2004). Modifications to the sampling procedures were implemented based on recommendations made in corrective action memoranda (CAMs). A discussion of the CAMs is presented in Section 2.1.1.1.

Samples collected at Bakers Falls were taken at the approximate centroid of the river cross section from the downstream side of Bakers Falls Bridge (County Rt. 27 Bridge). At Rogers Island, aliquots were collected from the center of the east and west channels using a boat. These aliquots were combined to form a composite sample using a volume ratio consistent with the flow ratio in the east and the west channel (60:40). To satisfy the lower polychlorinated biphenyl (PCB) analytical sensitivity requirements at these stations, 8 L of water were collected for each PCB sample from Bakers Falls and Rogers Island.

The remaining routine water sampling stations were sampled at either five or six substations located along transects across the river cross section. Sampling at Thompson Island was conducted from a boat at six Equal Discharge Increment (EDI) stations along a transect downstream of the southern tip of the island (Figure 2-2). Transect sampling at Schuylerville was conducted from a boat at six EDI locations along the upstream side of the Rt. 29 Bridge (Figure 2-3). Transect sampling at Stillwater was conducted from a boat at five EDI locations along the upstream side of the County Rt. 125 Bridge to the west of the entrance to Lock 4 land cut (Figure 2-4). Transect sampling at Waterford was conducted from a boat along the upstream side of the Rt. 4 Bridge at five EDI locations (Figure 2-5).

The samples for each of these stations consisted of a single composite made up of depth-integrated aliquots collected at the EDI locations. A variable speed bridge or boat mounted crane (Figure 2-6) was used to lower a custom-designed multiple aliquot depth integrating sampler (MADIS; Figure 2-7) containing twelve or sixteen 500-ml glass sample collection vessels, depending on sample volume requirements. The speed and distance that the sampler was lowered was adjusted according to water depth at each substation to allow collection of an appropriate sample volume. Each sample collection vessel was outfitted with a special cap with a sampling nozzle and air vent. The sampler was lowered through the water column to within approximately two feet of the river bottom and then retrieved, such that a depth-integrated sample aliquot was collected. Sample aliquots were retained when the volumes varied no more than $\pm 20\%$ of the target volume for the sampling location (e.g., 1/5 of the total sample volume for a transect with five EDI locations).

The entire sample volume collected from each EDI location along the transect was used to generate the single composite sample to be analyzed for a particular parameter or related set of parameters at each monitoring station. Sample containers used to collect the PCB sample(s) at each station were retained and transported to the laboratory along with the water sample(s). At the laboratory, the empty sample container was rinsed with hexane and the hexane rinsate was combined with the sample extract such that any residual PCBs from the sampling container were included in the PCB analysis.

2.1.1.1 Corrective Action Memoranda (CAM) Issued

No CAMs that pertained to the routine water sampling program were prepared in 2007. One CAM that addresses changes to the fish program was submitted to EPA in 2007 (Section 2.3.3.1).

2.1.1.2 TAL Metals

Samples were collected and analyzed for EPA target analyte list (TAL) metals in accordance with the water sampling and the Dissolved Metals SOPs (QAPP Appendices 1 and 44; QEA and ESI 2004). Upon completion of preparation of the composite sample at a transect location, a portion of that sample was designated for dissolved metals analysis, and was transported to a dedicated field laboratory facility for filtration. The sample was filtered through a 0.45 µm filter using the “clean-hands/dirty hands” procedure described in Appendix 44 of the QAPP. The resulting filtrate was placed in an appropriate container, double-bagged, and placed in a cooler with ice prior to transport to the analytical laboratory.

2.1.2 Field Parameters

Water quality parameters were measured at mid-depth at each sampling location (centroid or EDI) using a portable field probe. This probe consisted of a YSI 650 data logger and a YSI 6920 multiparameter sonde equipped with turbidity, pH, temperature, dissolved

oxygen (DO), and conductivity probes. Instrument calibration and data collection procedures were conducted in accordance with the SOP (QAPP Appendix 2; QEA and ESI 2004).

2.1.3 Waterford High Flow Sampling

PCB, total suspended solids (TSS), particulate organic carbon (POC), and dissolved organic carbon (DOC) were measured in samples collected at Waterford during six high flow events in 2007. High flow conditions are defined as flow at the United States Geologic Survey (USGS) gauging station at Fort Edward, NY (Station ID: 01327750) exceeding 15,000 cubic feet per second (cfs) or peak flow at Waterford expected to reach 22,500 cfs. Sampling was conducted at a centroid location from the Route 4 Bridge using the methods described in Section 2.1.1.

The method for tracking flow in the Hudson River during high flow events was modified on February 2, 2007 based on discussions with EPA. The QAPP specifies that the timing of the high flow sample collection will be based on instantaneous flow obtained at the Fort Edward USGS gauging station. However, it has been observed that flow at Fort Edward sometimes is not a reliable indicator of flow at Waterford due to local precipitation events in the drainage basin between Fort Edward and Waterford. In these situations, reliance on the Fort Edward hydrograph to select sample collection times can result in failure to sample a high flow event at Waterford. Therefore, the timing of sample collection has been modified to be based on flow at Waterford. USGS maintains a gaging station at Waterford; however, reliable flow data are not available during the navigational season when the Lock 1 dam pool is filled. Therefore, flow at Waterford during the navigational season is estimated by combining flow provided by USGS for the Battenkill, Hoosick River, and the Hudson River at Fort Edward. During the off- season, the flow provided by the Waterford gage is used.

In accordance with discussions with EPA, the timing of sample collection was also modified on February 2, 2007 to further evaluate the relationship between flow and PCB concentrations. After this date, sampling was initiated when flow at Waterford was expected to exceed 22,500 cfs and continued at 4,000 cfs increments along the rising limb of the hydrograph.

After peak flow was reached, two samples were collected the day after peak flow, then one sample per day for two subsequent days.

2.1.4 Mohawk River Water Column Monitoring

Mohawk River water samples were collected monthly during 2007 from the Rt. 32 Bridge at Cohoes and analyzed for PCBs and TSS. The Mohawk River was not sampled in January, February, or December due to ice conditions. Sampling was conducted at five EDI locations (Figure 2-8) using the same methods described in Section 2.1.1.

2.1.5 Lower Hudson Water Column Monitoring

Sampling in the Lower Hudson River at Albany/Troy and Poughkeepsie was conducted monthly from May through November 2007. The samples were collected from a boat at a centroid location (defined as the approximate center of the channel; Figure 2-1). A single, depth integrated sample was collected with the MADIS sampler. Due to the depth of the channel at the Poughkeepsie location (approximately 75 ft.), the MADIS sampler was only lowered through the uppermost 50 ft. of the water column.

2.2 SPECIAL STUDIES

With the exception of the sampling performed at the historical Thompson Island Dam (TID) monitoring station and the additional TSS sampling described below, the special studies specified in the QAPP (QEA and ESI 2004) have been completed.

2.2.1 Historical Stations

To provide a means to compare between the historical record of PCB concentrations at TID and Schuylerville, and PCB data collected under the BMP, the historical single point sampling locations at TID (TID-PRW2) and Schuylerville were sampled once per month

concurrent with routine water column sampling using the historical sampling methods associated with the PCRDMP (QEA 2000). This method involved lowering a Kemmerer bottle sampler into the water column to collect a sample. The method was repeated until sufficient volume was collected for all the parameters. Sampling at Schuylerville was discontinued in August 2006. PCB and TSS samples were collected at TID-PRW2 from April through November 2007. Field parameters were also monitored at this station.

2.2.2 Additional TSS Samples

During May and June 2007, an additional sample was collected at TID and Schuylerville for TSS analysis each week. This resulted in the collection of nine additional samples from TID and Schuylerville.

2.3 FISH PROGRAM

The BMP fish program was initiated in spring 2004 in accordance with the QAPP (QEA and ESI 2004). In 2007, adult fish were sampled in the spring and yearling pumpkinseed and forage fish were sampled in early fall. Fish collection was targeted within five pools of the Hudson River:

- Feeder Dam Pool (1 station);
- Thompson Island Pool (5 stations);
- Northumberland Pool (4 stations; one abandoned in 2004);
- Stillwater Pool (5 stations); and
- Albany/Troy (1 station – below Federal Dam in spring; Albany turning basin in fall).

The spring and fall fish sampling transect locations are depicted in Figure 2-9 and Figure 2-10, respectively.

2.3.1 Spring Species

Spring fish sampling occurred from May 21 through May 31, 2007 (Table 2-2). During sampling, adult species of black bass (largemouth and smallmouth bass), perch (yellow and white perch), and ictalurids (brown and yellow bullhead; white and channel catfish) were targeted from the 15 stations in the Upper Hudson River and one location in the Lower Hudson River (below Federal Dam in Troy). A total of 375 samples were collected from the spring sampling locations, corresponding to 125 individuals from the bass group, 125 from the bullhead group, and 125 from the perch group (Table 2-2). Collections of adult fish targeted the legal or edible size: >305, >200, >170, and >160 mm total length, for bass, bullhead/catfish, yellow perch, and white perch, respectively.

Twenty fish per species were collected in the spring in the Feeder Dam Pool and at Albany/Troy. Thirty fish per species were collected in the spring in Thompson Island Pool with ten individuals per species from the historical location behind Griffin Island (TD5) and five individuals per species from each of the four other stations. In Northumberland Pool, 25 fish per species were collected. Five individuals per species were targeted at ND1, ND2, and ND3 and ten individuals per species were targeted at ND5 to make up for ND4 which has been abandoned due to lack of fish. However, at ND1, only two perch were collected and at ND2 only one perch and one bullhead were collected. In agreement with EPA oversight (Mike Kane, NYSDEC), nine perch and nine bullhead were collected at ND3 and three perch were collected at ND5 to make up for the other stations. Thirty fish per species were collected from Stillwater Pool with ten individuals per species from the historical location at Coveville (SW3), and five individuals per species at each of the four remaining stations: SW1, SW2, SW4, and SW5. An extra bass was collected at SW5 due to only four being collected at SW4 (with agreement from EPA oversight, Mike Kane, NYSDEC).

2.3.2 Fall Species

Collection of forage fish and yearling pumpkinseed was conducted on September 11 and 12, was discontinued due to equipment malfunction, and resumed on October 3, 4, and 5, 2007

(Table 2-3). Forage fish were collected as whole body composites and included spottail shiner, spotfin shiner, mimic shiner, and golden shiner (one species per composite), based on availability. A total of 50 composites were targeted from the stations sampled in the fall (ten composites per pool; Table 2-3). Yearling pumpkinseeds were captured from each pool and submitted as whole body individual samples. Pumpkinseeds were considered yearlings if they were between 70 and 150 mm total length, in accordance with the requirements in the QAPP (QEA and ESI 2004). However, upon further discussion with EPA oversight and estimation of age in the 2004 and 2006 pumpkinseed samples, the targeted size range was reduced to between 70 and 130 mm during fall 2007 sampling in accordance with Corrective Action Memo No. 010 (Appendix A).

Twenty pumpkinseeds and ten composites of forage fish were collected at both Albany/Troy and the Feeder Dam Pool. Thirty pumpkinseeds were collected in the fall in Thompson Island Pool, with ten individuals from the historical location across from Griffin Island (TD5) and five individuals from each of the four other stations. Ten composites of forage fish were collected with two coming from each station. Samples were not obtained from the Fort Miller Pool (landlocked section; ND1 and ND2) since the private ramp used in previous events was not in safe condition. A field decision, with approval from EPA oversight (Mike Kane; New York State Department of Environmental Conservation [NYSDEC]), was made to collect additional samples from Northumberland Pool (ND3 and ND5) to obtain the target number for River Section 2 (25 pumpkinseed, 10 forage composites). After a few hours sampling at ND3, the five forage composites were collected, but only two pumpkinseed samples were obtained. The field decision was made to attempt to collect the remaining 23 pumpkinseed samples from ND5. After several hours of sampling at the traditional ND5 location with five composites of forage fish and nine pumpkinseed samples collected, the site was extended into the Lock 5 canal, adjacent to the Northumberland Dam, where the 14 remaining pumpkinseed samples were collected. Thirty pumpkinseeds were collected from Stillwater Pool with ten individuals from the historical location at Coveville (SW3) and five individuals at each of the four remaining stations (SW1, SW2, SW4, and SW5). Two composites of forage fish were collected at each station.

2.3.3 Sampling Methods

Electroshocking was used to collect target species. The edible portions for humans and wildlife were monitored; fillets for bass, ictalurids, and perch; individual, whole body samples for pumpkinseed; and whole body composites for spottail shiners or other forage fish species.

Electrofishing was accomplished with a 16 ft. boat equipped with a variable output gas-powered DC generator. Operating amperage was adjusted according to water conductivity to minimize injury; stunned fish were immediately removed from the electrical field using dip nets to minimize the duration of the shock. Fish were held in live-wells or buckets with frequent water changes during collection. Fish were sacrificed by a blow-to-the-head or by cervical dislocation.

Sampling methods were generally consistent with procedures outlined in the QAPP (QEA and ESI 2004) with a few exceptions:

- Filleting of adult individuals was conducted in the analytical laboratory to eliminate the need for decontamination materials in the field.
- Weighing adult fish to the nearest 0.1 gram in the spring was not feasible due to the activity of the fish and the slight sway of the boat. Fish weight was recorded to the nearest gram.
- During sampling below the Federal Dam in Albany (spring 2007), few bullhead were collected and channel catfish and white catfish were used as surrogates. These species were not listed as a surrogate for bullhead in the QAPP; however, a decision was made in the field (in 2004) with EPA oversight personnel (Ron Sloan, NYSDEC), that channel catfish and white catfish would be acceptable surrogates.
- Location ND4 was permanently abandoned during the first year of sampling due to lack of suitable habitat. A decision was made in the field, with the concurrence of EPA oversight (Ron Sloan, NYSDEC) to collect an additional five individuals per species from ND5.

Adult fish were collected along transects at each station during spring 2007. Transects were approximately 200 to 2,000 meters in length and were located parallel to the shoreline in water approximately 1 to 3 meters deep (Figure 2-9).

Fish were collected in fall 2007 generally along the same transects sampled in the spring. Transects at a few stations were modified based on historic NYSDEC yearling pumpkinseed locations that were in slightly different areas than adult fish locations. Transects were approximately 200 to 1,000 meters in length and were located parallel to the shoreline in water approximately 1 to 3 meters deep (Figure 2-10).

Fish were handled according to SOPs developed by NYSDEC (NYSDEC 2000). Measurements were made as soon as possible following collection, with calibrated instruments. For each specimen, the date of collection, a unique identification number or code, the location, including coordinates, genus and species, total length in millimeters (to nearest mm), weight in grams (to nearest 1.0 gram spring – 0.1 gram fall), sex (done in the analytical laboratory during processing), and method of collection were recorded in the BMP fish database. Each sample was then wrapped in clean aluminum foil (shiny side out), placed in a labeled plastic resealable storage bag, and kept on ice following data processing. The same information was also collected for composited fish, including number of individuals within the composite. Obvious external abnormalities were noted in the database. COC forms were generated after data were entered into the database and samples kept on ice and delivered by courier to Northeast Analytical Laboratory, Inc. (NEA). Samples were processed by experienced personnel at the laboratory and prepared tissues (standard fillets or whole bodies) were frozen at a temperature below -18°C until analyzed. Fish samples were analyzed within the one-year holding time.

2.3.3.1 Corrective Action Memoranda (CAM) Issued

One CAM was prepared and presented to EPA in 2007 (Appendix A). This memorandum (CAM 010) was submitted to EPA on March 28, 2007, and documented proposed changes to the fish sampling procedures. These changes included refining the criteria for sampling of yearling pumpkinseeds to focus on individuals between 70 and 130mm total length.

This sampling change was verbally agreed upon with EPA oversight (Ron Sloan, NYSDEC) in fall 2006, and was implemented in fall 2007, although GE is still awaiting written approval from EPA.

2.4 POST-CONSTRUCTION REMNANT DEPOSIT MONITORING

Monitoring of the Hudson River in the vicinity of the Remnant Deposits is required by the PCRDMP Consent Decree (Consent Decree 1990), and includes weekly sample collection at Bakers Falls and Rogers Island. The routine monitoring conducted for the BMP at these stations satisfies the requirements of the PCRDMP; therefore, this DSR will satisfy the reporting requirements of the PCRDMP. Preparation of a specific PCRDMP annual summary report has been discontinued.

2.5 ANALYTICAL PROGRAM

The BMP involved analysis of water and fish samples for chemical and physical parameters.

2.5.1 Water Program

The routine BMP water sampling program included laboratory analysis for congener-specific PCBs, TSS, POC, DOC, total metals, dissolved metals, and hardness. Congener-specific PCBs were quantified by single, whole water extraction. High flow samples collected at Waterford were analyzed for congener-specific PCBs, TSS, POC, and DOC. Monitoring at the Lower Hudson sampling locations included congener-specific PCBs and TSS.

Congener-specific PCB analysis of water samples was performed by NEA using the modified Green Bay Congener Method (mGBM) described in Appendix 9 of the QAPP (QEA and ESI 2004). Extraction and analysis techniques for congener-specific PCBs in Hudson River water were customized based on whether sampling stations require lower detection limit

methods. The procedures employed were modifications to existing methods to improve sensitivity and/or to take advantage of current extraction technology. Brief descriptions of the extraction and analytical methods for routine (1 L) and large-volume (8 L) samples are described in Sections B4.1.1 and B4.1.2 of the QAPP.

NEA analyzed 1 L water samples for TSS following the standard EPA protocol for the analysis of suspended sediment (Appendix 18 of the QAPP – SOP for the Determination of Suspended Solids by EPA Method 160.2; QEA and ESI 2004) with modifications to be consistent with the American Society for Testing and Materials (ASTM) D 3977-97 Standard Test Methods for Determining Sediment Concentration in Water Samples, Test Method B – Filtration as described in Section 4.1.2 of the QAPP.

POC and DOC analyses were also performed by NEA using in-house method NE128_03 as described in Appendix 19 of the QAPP (QEA and ESI 2004). TAL metals and hardness were analyzed by Severn Trent Laboratories (STL; Pittsburgh, PA). On June 18, 2007, STL was renamed TestAmerica. The analyses followed the SOPs in Appendices 14 through 17 in the QAPP. TAL metals were analyzed by EPA Method 200.8, with the exception of mercury, which was analyzed by EPA Method 245.1. Hardness was analyzed by EPA Method 130.2.

2.5.2 Fish Program

Fish were prepared for contaminant analyses following collection according to the SOP for Annual Fish Sampling (QAPP Appendix 21; QEA and ESI 2004). Fish samples were analyzed by NEA for total PCBs according to a modification of the EPA Method 8082 Aroclor Sum Method (NEA SOP 148, Revision 4; Appendix 25 of the QAPP; QEA and ESI 2004). Additionally, fish samples were analyzed by NEA to determine the lipid contents according to the methods outlined in NEA SOP 158, Revision 3 (Appendix 24 of the QAPP). The mGBM (NEA SOP 133, Revision 1; Appendix 26 of the QAPP) was performed by NEA on 10% of the total number of fish samples.

Prior to analysis, fish tissue, either whole body or fillet, was homogenized following the methods outlined in NEA SOP 132 (Appendix 22 of the QAPP, QEA and ESI 2004). Extraction and cleanup of fish tissue were accomplished via NEA SOP 17, Revision 3 (Appendix 23 of the QAPP).

SECTION 3 **QUALITY ASSURANCE/QUALITY CONTROL**

3.1 PE SAMPLES

GE prepared and submitted performance evaluation (PE) samples to NEA for both the 1 L and 8 L mGBM in December 2007. The PE samples contained the same 64 congeners contained in the PE samples used in the independent verification of the mGBM validation at concentrations near the current laboratory control spike (LCS) levels of 198 ng/L and 6 ng/L for the 1 L and 8 L mGBM, respectively. The 64 congeners are representative of those typically encountered in a Hudson River environmental sample. The laboratory summed the individual congener results on a homolog and total basis. An evaluation of the method performance was made based on acceptance limits of 70% to 130% for the homolog and total PCB results as compared to the known values. All recoveries for the homologs and total PCBs in both the 1 L and 8 L mGBM PE samples were within the 70% to 130% acceptance limits (Table 3-1).

3.2 FIELD QA/QC

QA/QC samples were collected in the field to allow evaluation of data quality. Field QA/QC samples for water column samples included equipment blank samples, blind duplicate samples, and matrix spike samples. Fish sampling does not facilitate the use of field QA/QC samples (e.g., duplicates) as part of the study design; all QA/QC samples for the fish sampling program were generated in the laboratory. The types and frequency of field QA/QC checks and samples collected for each parameter are described below.

3.2.1 Field Instrument Calibration

To ensure that field measurements completed during field data collection were collected with properly calibrated instruments, field personnel followed the manufacturer's recommendations and the procedures described below.

3.2.1.1 Water Program

For the water program, the YSI multi-parameter probe (Model 6920) was calibrated on a daily basis using known standards for turbidity, pH, and conductivity prior to each day's sampling events. The instrument's calibration was checked at the end of the day for calibration drift. In addition, prior to use, each major piece of equipment was cleaned, decontaminated, checked for damage, and repaired, if needed.

3.2.1.2 Fish Program

Balances used to weigh fish were calibrated each day prior to sampling. Calibration checks were recorded on a field log. A YSI 6920 water quality meter was used at each station. This meter was calibrated daily prior to use at each station in accordance with the users manual. The global positioning system (GPS) on each sampling vessel had a daily check on a point with known coordinates. Equipment was maintained and repaired in accordance with manufacturer's specifications (Section B6 of the QAPP; QEA and ESI 2004). In addition, prior to use, each major piece of equipment was cleaned, decontaminated, checked for damage, and repaired, if needed. Field calibration activities were noted in a field log notebook.

3.2.2 Equipment Blanks

Equipment blank samples were collected at the rate of 5% of the total number of environmental water samples or one per sample batch of up to 20 samples. Equipment blanks were not required for fish tissue samples in the approved QAPP (QEA and ESI 2004). Equipment blanks for water sampling were collected using a representative clean, individual sample container used for sub-sample collection in accordance with the water column sample collection SOP (Appendix 1 of the QAPP; QEA and ESI 2004) and CAM 001.

3.2.3 Field Duplicates

Field duplicate samples for water were collected and submitted to the analytical laboratory “blind” without any indication of the actual sample location. Because it is impossible to collect field duplicates for fish samples, duplicates for fish were generated in the laboratory by splitting the homogenate. Duplicates were prepared at the rate of 5% of the total number of environmental samples or one per sample batch of up to 20 samples.

3.2.4 Laboratory Duplicates/Matrix Spikes /Matrix Spike Duplicates

Laboratory duplicates (LDs) were typically substituted for matrix spikes (MS) or matrix spike duplicates (MSDs) for inorganic and wet chemistry analysis. Either MSDs or LDs were performed on fish samples, but not both. MS/MSDs/LDs were analyzed at the rate of one pair per sample batch (up to 20 samples) for fish samples. The water program included the analysis of MS samples at a rate of one per sample batch (up to 20 samples) and analysis of MSDs at a rate of one per month. Each MS consisted of an aliquot of laboratory-fortified environmental sample. The MS samples were extracted and analyzed following procedures used for actual sample analysis.

3.2.5 Hudson River Reference Material

The BMP fish program included provisions for the analysis of Hudson River Reference Material (HRRM - a NYSDEC-developed PE sample), if available, at a rate of one per fifty samples as a performance measure for PCB Aroclor analysis. The final HRRM, inclusive of documented acceptance limits, was not available prior to the fish monitoring program, so this QA/QC aspect of the program was not included in 2007.

3.3 LAB QA/QC

3.3.1 Method Blanks

Method blanks were prepared and analyzed by the contract laboratories at a rate of at least one per analytical batch. Method blanks for water consisted of laboratory-prepared blank water processed along with the batch of environmental samples including all manipulations performed on actual samples. Method blanks for fish consisted of sodium sulfate processed, along with the batch of environmental samples, including all manipulations performed on actual samples.

3.3.2 Laboratory Control Spikes

LCSs were analyzed at the rate of one per sample batch (up to 20 samples). LCSs consisted of laboratory-fortified method blanks. The purpose of analyzing laboratory control samples is to demonstrate the accuracy of the analytical method.

3.3.3 Temperature Blanks

A temperature blank was provided in each cooler sent from the laboratory to the field. The purpose of this sample was to document the temperature of the cooler upon arrival at the lab.

3.4 EPA SPLIT SAMPLES

EPA did not collect split samples during 2007.

3.5 FIELD AND LABORATORY AUDITS

A field audit of the 2007 water column collection activities performed by QEA field personnel was conducted by ESI on August 30, 2007. Although the on-site audit frequency for

water was to be one audit at the beginning and end of the field season according to the QAPP (Section C1.1.2.2; QEA and ESI 2004), a second field audit of the 2007 water column collection activities was not performed. A field audit of 2007 fall fish collection activities performed by QEA field personnel was conducted by ESI on September 11, 2007. The audits were conducted as described in the QAPP (Section C1.1.2.3; QEA and ESI 2004). The field audits indicated that the field crews conducted their work in a professional manner and complied with the procedures outlined in the QAPP and applicable SOPs. Additionally, the field audits indicated that consistent sample collection and processing procedures were used during 2007. A few minor issues were identified during the audits and are discussed in the audit reports (Appendix B). The issues identified in the audit reports did not jeopardize the data quality objectives of the project. When possible, the recommendations were discussed with the field team at the time of occurrence. A debriefing meeting was held with QEA field personnel at the conclusion of each audit. The field crews incorporated recommendations, as appropriate.

A laboratory audit was conducted by ESI personnel at STL Pittsburgh (TestAmerica) for TAL metals and hardness analysis on November 7, 2007. A laboratory audit was conducted by ESI personnel for NEA (providing PCB, TSS, and organic carbon analyses) on December 11, 2007. The audits of STL Pittsburgh (TestAmerica) and NEA were conducted as described in Section C1.2.3.3 and Appendix 40 of the approved QAPP and to provide feedback on laboratory operating issues with respect to method compliance, laboratory systems, and good laboratory practices.

The audit reports for STL Pittsburgh (TestAmerica) and NEA are included in Appendix B. The audits indicated that the laboratories were adhering to the project specific methods and quality assurance requirements.

3.6 DATA MANAGEMENT QA/QC

Data collected under the BMP are stored in an electronic database. Specialized application modules, outlined in the subsections below, were used to automate data collection, data evaluation, and data integration.

3.6.1 Field Sample Data Collection System

Field-generated data were entered into a field database via custom-designed forms developed in Microsoft® Access®. This custom application facilitated data entry and management of the collected field data for the project by capturing, managing, and maintaining field data, including electronic COC creation, sample ID creation, and bottle label creation. These forms were also developed to limit the possibility of data entry/transcription errors by including valid value pick lists for the required fields. In addition, several data fields are populated automatically to further reduce data entry/transcription errors.

3.6.2 Laboratory Data Checker

Custom computer code was written to automate checking of the electronic data deliverables (EDDs) submitted by the analytical laboratories. EDDs submitted to the data management system were automatically checked to ensure data reliability by checking them against several criteria including valid values, data types, and format. If any errors were detected on any of the levels, the file was corrected by the laboratory prior to loading into the data management system.

3.6.3 Data Verification Module

Custom computer code was written to facilitate the data evaluation process. An automated data verification module (DVM) verifies analytical data submitted by the laboratory, reviews the data against the performance specifications provided for the project, evaluates the data, produces exception reports, and loads qualified results to the project database.

The term “verification” is used to designate the criteria-based checking of the laboratory-reported QC results against the limits defined in the QAPP (QEA and ESI 2004). This comparison was used to qualify the data. The automated electronic data verification was performed on 100% of the analytical results received using the batch quality control results

provided by the laboratories in the EDDs. The specific measures evaluated during verification and the associated criteria are discussed in Section D2 of the QAPP (QEA and ESI 2004), and include:

- holding times;
- accuracy (by evaluating LCS and MS/MSD recoveries);
- precision (by evaluating LD results);
- field duplicate sample precision;
- blank contamination (laboratory method blanks and field generated blanks); and
- surrogate compound recoveries.

3.7 DATA VALIDATION

Electronic data verification and data validation (where necessary) were conducted after samples were collected and analyzed. The usability of the analytical data was assessed using a tiered approach. Data initially underwent an electronic data verification, which provided the first test of the quality of the results. This automated process assessed data usability by evaluating batch quality control results. The term “verification” is used because criteria-based checking of the laboratory-reported QC results against the limits defined in the QAPP (QEA and ESI 2004) is used to qualify data. Full data validation, i.e., manual qualitative and quantitative checking, was performed on 10% of all data, as well as any other analytical results that are subject to question.

Ten percent of PCB, as well as non-PCB data, were subject to manual validation. One of the first sample delivery groups (SDGs) provided for the year for each matrix (water or fish) was selected for validation in order to identify potential issues at the beginning of the project. Subsequent SDGs were selected randomly until the annual 10% validation goal was met for each matrix and method.

Non-PCB water data validated included:

- TAL metals;
- hardness;
- TSS;
- POC; and
- DOC.

Full validation included an evaluation of documented QA/QC measures through a review of tabulated QC summary forms and raw instrument data. The validation results were also compared to the results of the electronic verification for the same set of data, which provided an indication of the accuracy of the electronic verification process. Verification and validation findings are discussed in Section 8.

3.8 SAMPLE ARCHIVES

The 2007 sample extracts generated for PCB analysis as well as the homogenized fish tissue have been archived (frozen at < -10°C for extracts and < -18°C for fish tissue) and will be maintained until EPA approves this 2007 DSR. EPA will have the option of obtaining some, or all of the archived sample extracts pursuant to the RD AOC.

SECTION 4

ROUTINE WATER SAMPLING PROGRAM RESULTS

4.1 PCBS

The 2007 routine water monitoring included the collection and analysis of 296 samples (253 environmental plus 43 duplicates) for congener-specific PCBs by the mGBM. Sample results ranged from non-detect to 123 ng/L. Summary statistics for the PCB data are presented in Table 4-1. Temporal profiles of PCB concentration are presented for each routine water sampling station in upstream to downstream order in Figures 4-1 through 4-9.

4.2 TSS

During 2007 routine water monitoring, at total of 296 samples (253 environmental plus 43 duplicates) were collected and analyzed for TSS using EPA Method 160.2. Sample results for the detectable concentrations ranged from 0.9 mg/L to 72.5 mg/L. A temporal plot of the TSS concentrations is provided for each station in upstream to downstream order in Figures 4-1 through 4-9. Summary statistics for routine TSS samples are presented in Table 4-2.

4.3 POC/DOC

During 2007 routine water monitoring, a total of 282 samples (241 environmental plus 41 duplicates) were collected and analyzed for DOC using NEA Method NE128_03. A total of 282 samples (241 environmental plus 41 duplicates) were collected and analyzed for POC using NEA Method NE128_03. Sample results for DOC ranged from 2.22 to 22.20 mg/L. Sample results for POC ranged from non-detect to 2.76 mg/L. Summary statistics for DOC and POC data are presented in Table 4-3. During 2007, samples were erroneously collected for POC/DOC at the historic TID-PRW2 location three times and the stations in the lower Hudson once.

4.4 TAL METALS

During 2007 routine water monitoring, a total of 105 samples (90 environmental plus 15 duplicates) were collected and analyzed for total and dissolved TAL metals. Total beryllium, chromium, and silver concentrations and dissolved beryllium and silver were below the method detection limit for all stations in 2007. Summaries of total and dissolved TAL metal results are presented in Tables 4-4 and 4-5, respectively.

4.5 WATER QUALITY PARAMETERS

At each sampling location, water quality measurements were taken at mid-depth in the water column. Measurements of temperature, conductivity, pH, DO, and turbidity were taken using a YSI 6920 multi-parameter probe (Table 4-6). Prior to each day's sampling activities, the instrument is calibrated against standards to verify that the probe for each parameter is working correctly. However, once in the field, there are several factors that can influence the probe's output. These include environmental factors such as variability in air temperatures (especially in winter) between the controlled conditions under which the instrument is calibrated or transported compared to the field conditions that the probe is exposed to during deployment. Additionally, the probes can come in contact with debris during deployment. These factors may cause degradation of membranes and other components of the instrumentation in the field during use, resulting in the collection of inaccurate data.

The data collected by the probe are downloaded and reviewed during routine QA/QC checks. In the event the data appear to have been influenced by a faulty reading in the field (such as negative readings, or values that are well outside of the range of data normally measured), the data are moved from the parameter list to the comments section of the database along with a description of why the value was qualified. A place holder of -999 is used in the project database to indicate readings that have been qualified. The results of water quality parameter measurements are included in the project database (Appendix C).

4.6 OTHER DATA COLLECTION ACTIVITIES

Other data collection activities included obtaining daily mean flow recorded at the Fort Edward and Waterford USGS gauging stations. In addition, meteorological data was obtained from Northeast Regional Climate Center at Cornell University (NRCC 2007) for three locations near the river (Glens Falls Airport, Saratoga Springs, and Sunderland 2). The flow and meteorological data have been entered into a database (Appendix E). Other sampling related observations noted in the field are included in the project database in Appendix C.

SECTION 5 FISH PROGRAM RESULTS

5.1 PCBS

This section of the report presents fish PCB results. For each species, a spatial plot of the PCB concentrations is provided and summary statistics by river pool are included in tables. A total of 550 fish were collected from the Hudson River during the 2007 field sampling season (375 samples in spring, 175 samples in fall). Five hundred and fifty samples were submitted for Aroclor PCB analysis using Method SW846 8082 (NE148_04). Ten percent of the total number of fish analyzed for Aroclor PCBs were also analyzed for congener-specific PCBs using Method NE013_07. Of the 51 samples analyzed for congener-specific PCBs, 38 were collected during the spring sampling, and 13 were collected during the fall sampling. PCBs were detected in 48 fish analyzed using the congener-specific analytical method. A comparison of PCB concentrations measured using Aroclor and congener-specific methods is presented in Figure 5-1. The fish sampling program dataset is presented in the BMP database CD-ROM (Appendix D); electronic copies of the laboratory hardcopy data packages for these data are included on a CD-ROM in Appendix E.

5.1.1 Black Bass

During baseline monitoring in 2007, 125 black bass (largemouth bass and smallmouth bass) were collected from the Hudson River. Aroclor PCBs were detected in 117 samples (Table 5-1, Figure 5-2). Fifteen black bass were also submitted for congener-specific PCB analysis. Congener-specific PCBs were detected in 14 samples (Table 5-2).

5.1.2 Ictalurids

During baseline monitoring in 2007, 125 ictalurids (brown bullhead, yellow bullhead, channel catfish, and white catfish) were collected from the Hudson River. Of these, Aroclor

PCBs were detected in 113 samples (Table 5-3, Figure 5-3). Fourteen ictalurid samples were also submitted for congener-specific analysis. Congener-specific PCBs were detected in 13 ictalurids (Table 5-4).

5.1.3 Perch

During baseline monitoring in 2007, 125 perch (yellow perch and white perch) were collected from the Hudson River and submitted for Aroclor PCB analysis. Of these, Aroclor PCBs were detected in 105 samples (Table 5-5, Figure 5-4). Nine perch were also submitted for congener-specific PCB analysis. Congener-specific PCBs were detected in 8 samples (Table 5-6).

5.1.4 Pumpkinseed

During baseline monitoring in 2007, 125 pumpkinseed were collected from the Hudson River. Aroclor PCBs were detected in 125 samples (Table 5-7, Figure 5-5). Nine pumpkinseed were also submitted for congener-specific PCB analysis. Congener-specific PCBs were detected in all nine samples (Table 5-8).

5.1.5 Forage Fish

A total of 50 forage fish (common shiner, fallfish, golden shiner, and spottail shiner) composites were collected from the Hudson River during the 2007 sampling season. Aroclor PCBs were detected in all samples (Table 5-9 Figure 5-6). Four forage fish composites were also submitted for congener-specific PCB analysis. Congener-specific PCBs were detected in all four samples (Table 5-10).

5.2 LIPIDS

Lipid results for fish are presented in this section by species. Summary statistics are included in tables for each species by river pool. A total of 550 fish were collected from the Hudson River during the 2007 field sampling season (375 samples in spring, 175 samples in fall). Percent lipid was measured on all 550 samples using Method NE158_03. The lipid results are included in the fish dataset presented in the BMP database CD-ROM (Appendix D); electronic copies of the laboratory hardcopy data packages for these data are included on a DVD in Appendix E.

5.2.1 Black Bass

During baseline monitoring in 2007, percent lipid was measured in 125 black bass (largemouth bass and smallmouth bass) fillet samples collected from the Hudson River (Table 5-11).

5.2.2 Ictalurids

During baseline monitoring in 2007, percent lipid was measured in 125 ictalurids (brown bullhead, yellow bullhead, channel catfish, and white catfish) fillet samples collected from the Hudson River (Table 5-12).

5.2.3 Perch

During baseline monitoring in 2007, percent lipid was measured in 125 perch (yellow perch and white perch) fillet samples collected from the Hudson River (Table 5-13).

5.2.4 Pumpkinseed

During baseline monitoring in 2007, percent lipid was measured in 125 whole body pumpkinseed collected from the Hudson River (Table 5-14).

5.2.5 Forage Fish

A total of 50 forage fish (mimic shiner, spotfin shiner, golden shiner, and spottail shiner) composites were collected from the Hudson River during the 2007 sampling season; percent lipid was measured in 50 samples (Table 5-15) .

5.3 SEX

Results for fish sexing are presented in this section by species. Summary statistics are included in tables for each species by river pool. A total of 550 fish were collected from the Hudson River during the 2007 field sampling season (375 samples in spring, 175 samples in fall). The sex was determined for each individual collected in the spring. The fish sex results are included in the fish dataset presented in the BMP database CD-ROM (Appendix D).

5.3.1 Black Bass

During baseline monitoring in 2007, fish sex was identified in 125 black bass (largemouth bass and smallmouth bass) collected from the Hudson River with 67 males and 58 females (Table 5-16).

5.3.2 Ictalurids

During baseline monitoring in 2007, fish sex was identified in 120 ictalurid (brown bullhead, yellow bullhead, channel catfish, and white catfish) samples collected from the Hudson River with 45 males and 75 females (Table 5-17). Sex could not be determined in 5 individuals.

5.3.3 Perch

During baseline monitoring in 2007, fish sex was determined in 100 perch (yellow perch and white perch) samples collected from the Hudson River with 61 males and 39 females. Sex could not be determined in 25 individuals (Table 5-18).

5.4 FIELD OBSERVATIONS

Fish condition was assessed using field measurements and field observations. Observed external abnormalities were recorded to assess fish condition. Ictalurids appeared to be display the most external abnormalities. Of the ictalurids captured from the Feeder Dam Pool, one had scarring on the ventral surface, two had lesions, three had torn fins, one had a broken spine, three had wounds on the body, three had fin erosion, and one had a contusion near the adipose. Of the bass captured in this pool two had blackspot, three had fin erosion, one had a lesion on the gill plate, and one had a missing gill plate. For the perch species five showed fin erosion, one had yellow grubs, two had torn pelvic fins, one had a split caudal fin, one had a torn dorsal fin, and one had a leech on the caudal fin.

Of the ictalurids captured from Thompson Island Pool, three showed evidence of melanoma, one was blind in the left eye, one had a lamprey wound, three had lesions near the mouth, five showed evidence of fin erosion, four had burned barbels, two had missing spines, and one had a leech attached. For the bass that were captured from Thompson Island Pool, two fish had fin erosion and seven had blackspot. Of the yellow perch captured, four showed signs of fin erosion, one had a wound near the dorsal fin, two had a leech attached, one had a deformed head area, one had a split dorsal fin, and one had yellow cysts near the caudal fin.

Of the ictalurids captured from the Northumberland/Fort Miller Pool, four showed evidence of burned barbels, three showed evidence of melanoma, three had lesions around the mouth, one had a tumor, one had a leech attached, two had a wound on the body, and five had fin erosion. One yellow perch from the Northumberland/Fort Miller Pool showed evidence of black spot, one had skin lesions, seven had fin erosion, and one had a wound near the dorsal fin. Of

the bass captured twelve had blackspot, one had a leech attached, three had fin erosion, three had damaged gill plates, three had lesions, and five had abrasions.

Of the ictalurids captured, four had burned barbels, three had lesions on the mouth, four showed evidence of melanoma, three had eroded fins, one had a disfigured caudal fin, one had a leech attached, two had missing barbels, one had a broken spine, and one had a mussel attached to its whisker. Of the yellow perch captured from the Stillwater Pool, three showed evidence of fin erosion and five had black spot. In the bass group, four had blackspot and two had fin erosion.

Of the ictalurids captured at Albany/Troy, one had right eye damage, two had left eye damage, one had wounds on the body, one had a deformed caudal peduncle, one had a broken spine, one had melanoma, and two had leeches on the fins. Of the bass captured, ten had fin erosion, five had abrasions on the head, five had lesions on the head, three had blackspot, one had a leech attached, two had split fins, one had a broken dorsal spine, and one had a wound near the left pelvic fin. For the perch one had a leech attached, six had fin erosion, four had lesions, and one had a split fin.

The weight and total length of captured fish were measured to assess fish condition. Condition index was determined using the following equation:

$$Condition\ Index(K) = \frac{Weight(g)*100,000}{Length(mm)^3} \quad (5-1)$$

A condition index of 1.0 indicates a fish of normal condition. A condition index greater than 1.0 indicates a fish of better than average condition.

Black bass, ictalurids, perch, and pumpkinseed captured from all five pools during the 2007 BMP had a condition index greater than 1.0 (Figures 5-7 through 5-11, respectively). Forage fish captured during the 2007 BMP had a condition index less than 1.0 at all stations (Figure 5-11); ranging from 0.84 to 0.94.

SECTION 6 **SPECIAL STUDIES AND HIGH FLOW SAMPLING RESULTS**

6.1 HISTORICAL STATIONS

During the 2007 BMP, six environmental samples were collected at the historical TID-PRW2 station. These samples were submitted for PCB, TSS, and POC/DOC analysis. At TID-PRW2, PCB concentrations were above the MDL of 9.3 ng/L in five of the six samples, with detectable concentrations that ranged from 14.96 to 28.0 ng/L (Table 6-1, Figure 6-1). TSS concentrations at TID-PRW2 ranged from non-detect to 2.73 mg/L (Table 6-2, Figure 6-1). A summary of POC/TOC data is presented in Table 6-3. The historical data are included in the BMP database CD-ROM (Appendix C); electronic copies of the laboratory hardcopy data packages for these data are included on a DVD in Appendix D.

6.2 WATERFORD HIGH FLOW

During the 2007 BMP, high flow samples were collected during six high flow events. Thirty-four environmental samples were submitted for PCB, TSS, DOC, and POC. PCB and TSS data are presented for each high flow event on Figure 6-2. PCB concentrations ranged from 9.69 to 67 ng/L (Table 6-1). TSS concentrations during high flow events ranged from 11.7 to 281 mg/L (Table 6-2). A summary of POC/TOC data is presented in Table 6-3. The Waterford high flow sampling data are included in the BMP database CD-ROM (Appendix C); scanned copies of the laboratory hardcopy data packages for these data are included in a DVD in Appendix D.

6.3 ADDITIONAL TSS SAMPLES

During May and June 2007, TSS samples were collected twice weekly (once during routine sampling and one additional round) at TID and Schuylerville. This resulted in the collection of nine additional samples from TID and nine additional samples from Schuylerville

for TSS analysis. The TSS concentrations for these additional samples ranged from non-detect to 7.78 mg/L at TID and from 1.19 to 4.24 mg/L at Schuylerville. Summary statistics for additional TSS samples are incorporated into Table 6-4. The additional TSS sampling data are included in the BMP database CD-ROM (Appendix C); electronic copies of the laboratory hardcopy data packages for these data are included in a DVD in Appendix D.

SECTION 7

POST CONSTRUCTION REMNANT DEPOSIT MONITORING RESULTS

Over an approximate 30-year period, ending in 1977, two GE capacitor manufacturing facilities in Fort Edward and Hudson Falls, New York discharged PCBs into the Upper Hudson River (Figure 7-1). Much of the PCBs were contained in sediment deposited in the pool behind the Fort Edward Dam located at Hudson River Mile (HRM)¹ 194.9 (Figure 7-1). Removal of the 100 year old dam by Niagara Mohawk Power Corporation in 1973 dropped water levels in the pool. As a result, an estimated 1.5-million cubic yards of sediment deposits (referred to as the Remnant Deposits) were left along the banks of the river up to 1.5-miles upstream of Fort Edward (NUS 1984).

GE completed the in place containment of the Remnant Deposits during the fall of 1990 (O'Brien & Gere 1996; JL Engineering 1992). The objectives of this containment were to control the release of PCBs from the Remnant Deposits to the Hudson River and to minimize potential human exposure to PCBs as a result of direct contact or volatilization (Consent Decree 1990). Post construction monitoring has been conducted since 1991.

Beginning in 1991, the water column of the Hudson River has been monitored for PCBs utilizing capillary column analytical techniques with a total PCB method detection limit (MDL) of 11 ng/L (O'Brien & Gere 1992a, 1992b). This PCRDMP was initiated by O'Brien & Gere in 1992, and has been performed on an annual basis since. Beginning in June of 2004, GE initiated the BMP, in accordance with the Administrative Order of Consent for the Hudson River Remedial Design and Cost Recovery for the Hudson River Dredging Project (EPA and GE 2003). The water column monitoring requirements for the PCRDMP have been included in the BMP; therefore sampling activities performed to comply with the Consent Decree (Consent Decree 1990) after June 1, 2004 are being conducted as part of the BMP.

¹ For reference, the HRM system begins at the southern tip of Manhattan (the Battery) in New York City, and increases traveling upstream.

The PCRDMP consisted of water column data collection and reporting for stations located at Bakers Falls and at the Route 197 Bridge (Section 2.1, Figure 7-1). Additionally, routine water column samples were collected from a location at the base of Bakers Falls in the vicinity of the Hudson Falls Plant site on a weekly basis throughout 2007. This location, designated as BOATLAUNCH, is illustrated in Figure 7-1. This monitoring is not required by the PCRDMP Consent Decree (Consent Decree 1990) or the Consent Decree for the GE Hudson Falls plant site. These data are routinely reported to NYSDEC (Hudson Falls Plant Site Weekly Status Reports; NYSDEC site code 5-58-013, GE 2007).

The remedial action performed on the Remnant Deposits continued to be an effective measure for controlling the migration of PCBs to the Hudson River in 2007. The primary evidence for this is that the increase in PCB concentrations observed at the Route 197 Bridge compared to background conditions is minimal (typically only 2 to 3 ng/L higher than Bakers Falls; Figure 7-2). Additionally, monitoring performed in the Hudson River adjacent to the GE Hudson Falls plant site indicate that the area continued to contribute PCBs to the water column during 2007. Increased concentrations detected in the vicinity of the Hudson Falls Plant Site (relative to the background station at Bakers Falls) generally correlate with increases in PCB concentrations at Rogers Island. This condition indicates that the Boat Launch sampling station is useful as qualitative indicator of the magnitude of the GE Hudson Falls Plant Site area source.

SECTION 8 DATA QUALITY

8.1 PE PROGRAM

PE samples were submitted to NEA for the 1 L and 8 L mGBM as required by Section C1.2.1 of the BMP QAPP. The results of the PE sample analysis have been previously described in Section 3.2.

8.2 VALIDATION / VERIFICATION

8.2.1 Data Verification and Validation Results for Water Samples

Electronic data verification and data validation were conducted as described in Section 3.8 after samples were collected and analyzed to provide an understanding of the analytical data quality. During 2007, 10% of the environmental samples were manually validated. The number of 2007 samples validated for each method is described in Section 3.7. Additionally, Appendix F provides a listing of each 2007 sample that was validated for each method and laboratory. Appendix G provides copies of the six data validation reports prepared for each group of 2007 sample data that were validated. These reports provide the specific details of the data qualification resulting from the validation process.

Validation qualifier codes were placed next to the results in the GE analytical database so that data users can quickly assess the qualitative and/or quantitative reliability of any result. The analytical database was then used to generate tabulated reports (data tables) of the validation results and qualifier codes. The final validated results for each data set are presented as data tables in each data validation report included in Appendix G.

The same qualifier codes were used for both the data verification and validation processes. The qualifier codes and definitions used for the data were as follows:

- “Null” - No qualifier code. The compound was detected and should be considered quantitatively and qualitatively valid based on the QC reviewed.
- U - The compound/analyte was analyzed for, but was not detected above the reported sample detection limit.
- <J - The sum of the positive PCB congener peaks for the sample is greater than 0 but is below the sample-specific total PCB MDL. Quantitation is approximate (estimated).
- U* - This compound/analyte should be considered “not detected” since it was detected in a blank at a similar level.
- J - Quantitation is approximate (estimated) due to limitations identified during the quality assurance review (data validation).
- N - The analysis indicates that there is presumptive evidence to make a “tentative identification” of this compound/analyte.
- R - Unusable (rejected) result – compound/analyte may or may not be present in this sample.
- UR - Unusable “not-detected” result; compound may or may not be present in this sample.
- UJ - This compound/analyte was not detected, but the quantitation/detection limit is probably higher than reported due to a low bias identified during the quality assurance review.
- S - The result should be considered suspect.

The validation qualifier code field of the GE analytical database was queried to provide a tabulation of the number of results for each analysis fraction that was valid as reported (unqualified results and non-detected results, U and <J for total PCBs only) and that was qualified with each qualifier code identified above. The percent usable and unusable data and the percent completeness were calculated for each analysis fraction according to the following equations:

$$\begin{aligned} \text{\% Usable Data} &= \text{Unqualified Positive Results} + \#U (\text{+}\#\text{<}J \text{ for Total PCBs}) + \\ &\quad \#U^* + \#J + \#JN + \#UJ / \text{Total Number of Results} \end{aligned}$$

$$\begin{aligned}\% \text{ Unusable Data} &= \#R + \#UR / \text{Total Number of Results} \\ \% \text{ Completeness} &= \frac{\text{Valid Data as Reported} [\text{Unqualified Positive Results} + \#U]}{\text{[Total Number of Results} - \text{positive results } <\text{RL} - \#J]}\end{aligned}$$

The percent completeness calculation does not include results qualified as estimated values (“J”) due to being below the sample-specific reporting limit but above the MDL and total PCB results qualified as <J for being above 0 but below the sample-specific MDL. These results are not included in the completeness calculation because they are estimated values pursuant to a standard EPA analytical data reporting convention.

A summary of the data quality for the individual analytical fractions is presented in the following sections. The data quality has been described based on the percent completeness and percent usable results as follows:

Qualitative Data Quality (QDQ)	% Completeness	% Usable
Excellent	95%	100%
Very Good	85%	95%
Good	75%	90%
Above Average	65%	85%
Average	45%	80%
Poor	<45%	<80%

The percent completeness goal stated in the QAPP (QEA and ESI 2004) is 95%. The above Qualitative Data Quality (QDQ) index was based on professional judgment and experience. It was developed to provide a qualitative framework to discuss the data quality. Although the description of data quality has been based on criteria for both the percent completeness and percent usable data calculations, the percent usable data calculation is a more critical reflection of the data quality than the percent completeness calculation. Percent completeness reflects the percentage of the data that satisfied all of the DQOs (i.e., the percentage of unqualified data), whereas percent usability reflects the percentage of the data that has some qualitative and/or quantitative use, which is inclusive of the data that satisfied all of the DQOs. The results of the percent completeness calculation do not indicate the nature of the qualification of the “incomplete” data. The data which are usable but qualitatively or quantitatively qualified (i.e., the difference between the percent usable data and the percent

completeness) may have no impact on the end use of the data, depending on what decisions need to be made based on that data. In other words, data that have low percent completeness may still be “100% usable” for decision-making purposes.

The following example calculations are provided based on the percent completeness, percent unusable, and percent usable data presented on Table 8-1 for PCB congeners (whole water extraction) (NE207_03) and following the explanations in Notes 6, 7, and 8:

1. Percent Completeness is the sum of results that were valid as reported [Unqualified Positive Results + U]/[Total Number of Results - J⁴ - <J³].

$$Ex. 91.3 = [4,585 + 28,848]/(42,375 - 5,716 - 43)] * 100$$

2. Percent Unusable Data is the sum of the results qualified R + UR/Total Number of Results.

$$Ex. 0.0\% = [(0 + 0)/42,375] * 100$$

3. Percent Usable Data is the sum of the Unqualified Positive Results + U [+<J³ for Total PCBs] + U* + J + JN + UJ/Total Number of Results.

$$Ex. 100\% = [(4,585 + 28,848 + 43 + 2,280 + 0 + 6,052 + 0 + 567)/ 42,375] * 100$$

The overall data quality for the water sample data is very good and all of the results are usable (Table 8-1). The percent usable data, percent unusable data, and percent completeness for the entire water data set are 100%, 0.0%, and 88.8%, respectively. None of the water data was qualified as unusable. The overall data quality for the fish tissue sample data is excellent and all of the results are usable (Table 8-2). The percent usable data, percent unusable data, and percent completeness for the entire fish tissue data set are 100.0%, 0.0%, and 92.3%, respectively. None of the fish data was qualified as unusable.

8.2.1.1 Data Verification and Validation Results for PCBs Congeners

The data quality for the water samples for PCB congeners (whole water extraction) analyzed by NE207_03 is very good (Table 8-1). The percent usable data, percent unusable data, and percent completeness for the entire PCB congeners (whole water extraction) data set are 100%, 0.0%, and 91.3%, respectively. None of the data was qualified as unusable.

The data verification module used to verify the PCB analysis data tracks the reason(s) that sample results are qualified for the individual assessment measures (e.g., holding times). The GE database was queried to determine why those data were qualified, but results from manual validation are not tracked in the GE analytical database. Thus, the validation reports were also evaluated manually. This combined assessment indicated that the electronic data verification process identified the primary quality control measures that resulted in qualification of data, as listed below in order of decreasing frequency:

- Blank contamination – Positive sample results that exhibited PCB concentrations similar to that in the field and method blanks were qualified as “not-detected” and flagged “U*.” Qualification due to blank contamination occurred for approximately 5.4% of the PCB congener (whole water extraction) data set and was limited to individual PCB congener results.
- Total PCB results summed from estimated individual congener results – The Total PCB results in all samples (0.88% of results) were qualified as estimated because at least one of the individual congener results that were summed to calculate the Total PCB result was qualified as estimated.
- Holding time – Positive and “not-detected” results as estimated “J” and “UJ”, respectively for, when analysis holding times were exceeded. Qualification due to exceedance of the analysis holding time occurred for approximately 0.80% of the PCB sample results.

- Surrogate recoveries outside of acceptance criteria – Water sample results associated with surrogate recoveries outside of acceptance criteria (outside of 60-140%) resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively for approximately an additional 0.53% of the PCB congener (whole water extraction) data set.
- Exceeded temperature upon laboratory receipt – Water sample results associated with exceeded temperatures upon sample receipt resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively, for approximately 0.53% of the sample results.
- MS or MSD recoveries outside of acceptance criteria – Water sample results associated with MS recoveries outside of acceptance criteria (outside of 60-140%) resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively for approximately an additional 0.27% of the PCB congener (whole water extraction) data set.
- Field duplicate precision – Water sample results associated with original and field duplicate samples that did not meet the project laboratory replicate precision criteria resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively for approximately 0.13% of the PCB congener (whole water extraction) data set.

As the above list indicates, qualification of data occurred primarily from blank contamination, exceeded holding time, and surrogate and MS/MSD recoveries that were outside of criteria. Additionally, approximately 14% of the data were qualified as estimated “J” due to the standard EPA analytical data reporting convention of qualifying data as estimated when they fall between the reporting limit and the MDL.

8.2.1.2 Data Verification and Validation Results for Other Parameters

The data quality for total metals and dissolved metals by EPA Method 200.8 is above average (Table 8-1). The percent usable data, percent unusable data, and percent completeness for the total metals by EPA Method 200.8 data set are 100%, 0.0%, and 69.6%, respectively.

The percent usable data, percent unusable data, and percent completeness for the dissolved metals by EPA Method 200.8 data set are 100%, 0.0%, and 64.5%, respectively. None of the data was qualified as unusable. The queries of the GE database and manual evaluation of the data validation reports revealed that metals sample results were qualified for the following reasons, listed in order of decreasing frequency:

- Blank contamination – Qualification as “U*”, due to field, method, or calibration blank contamination occurred for 26% of the total and dissolved metals sample results (24% of the total metals results and 28% of the dissolved metals results).
- Field duplicate precision – Water sample results associated with original and field duplicate samples that did not meet the project field duplicate precision criteria resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively for approximately 0.52% of the samples results (0.50% of the total metal results and 0.55% of the dissolved metals results).
- Serial dilution precision – Water sample results associated with a serial dilution outside of precision criteria results in qualification of positive results for 1 total metal and 2 dissolved metals as estimated “J” for 1 SDG (0.90% of the sample results).
- Negative calibration verification blanks – Water sample results associated with calibration verification blanks with negative results with absolute values greater than two-times the MDL resulted in qualification of “not-detected” results for one analyte (total and dissolved) as estimated “UJ” for 1 SDG (0.60% of the sample results).
- Dissolved metal results significantly greater than total metal results – Water sample results where the dissolved metal result was significantly greater than the total metal result resulted in qualification of positive results as estimated “J” for approximately 0.45% of the metal sample results.
- High relative standard deviations among multiple exposures – Water sample results with high relative standard deviations among multiple exposures were qualified as estimated for approximately 0.05% of the metal sample results.

- MS recoveries outside of acceptance criteria – Water sample results associated with MS recoveries outside of acceptance criteria resulted in qualification of positive results as estimated “J” for approximately 0.03% of the metals sample results (0.05% of the total metals results).

Qualification of total and dissolved metals by EPA 200.8 data occurred primarily due to blank contamination. Additionally, approximately 19% of the total and dissolved metals by EPA 2008 data were qualified as estimated “J” pursuant to the standard EPA analytical data reporting convention of qualifying data as estimated that fall between the reporting limit and the MDL.

The data quality for total and dissolved mercury is excellent and very good, respectively (Table 8-1). The percent usable data, percent unusable data, and percent completeness for the total mercury data set are 100.0%, 0.0%, and 95.3%, respectively. The percent usable data, percent unusable data, and percent completeness for the dissolved mercury data set are 100.0%, 0.0%, and 93.2%, respectively. The queries of the GE database revealed that four total mercury sample results and six dissolved mercury sample results were qualified due to blank contamination (5.6% of the mercury data). Approximately 3.3% of the mercury sample results were qualified as “J” pursuant to the standard EPA analytical data reporting convention of qualifying data as estimated that fall between the reporting limit and the MDL.

The data quality for hardness by EPA 130.2 and by SM 2340C is excellent (Table 8-1). The percent usable data, percent unusable data, and percent completeness for the hardness data set are 100.0%, 0.0%, and 100%, respectively. The queries of the GE database and manual evaluation of the data validation reports revealed that hardness data was not qualified for any reason.

The data quality for TSS by EPA 160.2 is very good (Table 8-1). The percent usable data, percent unusable data, and percent completeness for the TSS data set are 100.0%, 0.0%, and 94.0%, respectively. The queries of the GE database and manual evaluation of the data validation reports revealed that TSS sample results were qualified for the following reasons, listed in order of decreasing frequency:

- Field duplicate precision – Qualification of positive results as estimated “J” due to field duplicate imprecision occurred for approximately 2.6% of the TSS sample results.
- Laboratory replicate precision – Water sample results associated with original and laboratory replicate samples that did not meet the project laboratory replicate precision criteria resulted in qualification of positive results as estimated “J” for approximately 2.6% of the TSS sample results.
- Holding time – Positive results were qualified as estimated “J”, when analysis holding times were exceeded. Qualification due to exceedance of the analysis holding time occurred in four samples or approximately 0.78% of the TSS sample results.
- Exceeded temperature upon laboratory receipt – TSS sample results associated with exceeded temperatures upon sample receipt resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively, for approximately 0.52% of the sample results.

All of the TSS data are usable, but approximately 6.0% were qualified as estimated “J” or “UJ”, due to the issues listed above. Qualification of TSS data occurred primarily due to field duplicate and laboratory replicate imprecision, and exceeded holding times.

The data quality for POC/DOC is poor (Table 8-1). The percent usable data, percent unusable data, and percent completeness for the POC/DOC data set are 100.0%, 0.0%, and 43.7%, respectively. The queries of the GE database and manual evaluation of the data validation reports revealed that POC/DOC sample results were qualified for the following reasons, listed in order of decreasing frequency:

- Blank contamination – Qualification as “U*”, due to method or field blank contamination occurred for 31% of the POC/DOC sample results.
- Holding time – Positive results were qualified as estimated “J”, when analysis holding times were exceeded. Qualification due to exceedance of the analysis holding time occurred in approximately 24% of the POC/DOC sample results.

- Laboratory duplicate precision – Qualification of positive results as estimated “J”, due to field duplicate imprecision occurred for approximately 5.9% of the POC/DOC sample results.
- MS recoveries outside of acceptance criteria – Water sample results associated with MS recoveries outside of acceptance criteria resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively, for approximately 4.5% of the POC/DOC sample results.
- Field duplicate precision – Qualification of positive results as estimated “J”, due to field duplicate imprecision occurred for approximately 2.0% of the POC/DOC sample results.
- Exceeded temperature upon laboratory receipt – POC/DOC sample results associated with exceeded temperatures upon sample receipt resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively, for approximately 0.72% of the sample results.

All the POC//DOC data are usable, but approximately 26% were qualified as estimated “J” or “UJ” and 31% were qualified due to blank contamination due to the issues listed above. Qualification of POC/DOC data occurred primarily due to blank contamination and exceeded holding times.

8.2.2 Data Verification and Validation Results for Fish Tissue Samples

8.2.2.1 Data Verification and Validation Results for PCBs as Aroclors

The data quality for PCBs as Aroclors in fish tissue analyzed by method NE148_04 is excellent (Table 8-2). The percent usable data, percent unusable data, and percent completeness for the entire PCBs as Aroclors data set are 100.0%, 0.00%, and 96.0%, respectively. None of the data was qualified as unusable.

The data verification module used to verify the PCB analysis data tracks the reason(s) that sample results are qualified for the individual assessment measures (i.e., holding times). The GE database was queried to determine why those data were qualified, but results from manual

validation are not tracked in the GE analytical database. Thus, the validation reports were also evaluated manually. This combined assessment indicated that the electronic data verification process identifies the primary quality control measures that resulted in qualification of data, as listed below in order of decreasing frequency:

- LCS recoveries outside of acceptance criteria – Fish tissue sample results associated with LCS recoveries outside of acceptance criteria resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively, for approximately 3.6% of the sample results.
- Laboratory replicate precision – Fish tissue sample results associated with original and laboratory replicate samples that did not meet the project laboratory replicate precision criteria resulted in qualification of positive results as estimated “J” for approximately 0.07% of the samples results.

As the above list indicates, qualification of data as estimated “J” or “UJ” occurred primarily from the out-of-criteria LCS recoveries. Additionally, approximately 3.0% of the data were qualified as estimated “J” due to the standard EPA analytical data reporting convention of qualifying data as estimated when they fall between the reporting limit and the MDL.

8.2.2.2 Data Verification and Validation Results for PCB Congeners

The data quality for the fish tissue sample PCBs congeners analyzed by NE013_07 is excellent (Table 8-2). The percent usable data, percent unusable data, and percent completeness for the entire PCBs as Aroclors data set are 100.0%, 0.0%, and 88.3%, respectively. None of the data was qualified as unusable. The queries of the GE database revealed that the PCB congener sample results were qualified for the following reasons, listed in order of decreasing frequency:

- Exceeded temperature upon laboratory receipt - Fish tissue sample results associated with exceeded temperatures upon sample receipt resulted in qualification of positive and “not-detected” results as estimated “J” and “UJ”, respectively, for approximately 7.8% of the sample results.

- Blank contamination – Positive sample results that exhibited PCB concentrations similar to that in the method blanks were qualified as “not-detected” and flagged “U*”. Qualification due to blank contamination occurred for approximately 2.0% of the sample results and was limited to individual PCB congener results.
- Total PCB results summed from estimated individual congener results – The Total PCB results in all samples (0.89% of results) were qualified as estimated because at least one of the individual congener results that were summed to calculate the Total PCB result was qualified as estimated.
- Laboratory replicate precision – Fish tissue sample results associated with original and laboratory replicate samples that did not meet the project laboratory replicate precision criteria resulted in qualification of one positive result as estimated “J” for approximately 0.02% of the samples results.

As the above list indicates, qualification of data occurred primarily from exceeded temperatures upon laboratory receipt and blank contamination. Additionally, approximately 29% of the data were qualified as estimated “J” due to the standard EPA analytical data reporting convention of qualifying data as estimated when they fall between the reporting limit and the MDL.

8.3 FIELD DUPLICATES

Water field duplicates were submitted for analysis by NE207_03 (PCB congeners), EPA 200.8 (total and dissolved ICP/MS metals), EPA 245.1 (total and dissolved mercury), EPA 130.2/SM 2340C (hardness), EPA 160.2 (TSS), and NE128_03 (POC, DOC). Field duplicates were prepared in the field at the rate of 5% of the total number of environmental samples or one per sample batch of up to 20 samples. Fish tissue field duplicates were not submitted for analysis because it is impossible to collect field duplicates for fish samples.

The precision criteria for field duplicate pairs are presented in Section B5.1.2 of the QAPP (QEA and ESI 2004). For field duplicate pairs where both results were greater than or equal to five times the reporting limit, the precision criterion is that the relative percent

difference (RPD) between the results should be less than or equal to 35% for PCB congeners and less than or equal to 20% for all other parameters. For field duplicate pairs where at least one of the results was less than five times the reporting limit (including when one result was a non-detect), the precision criterion is that the difference between the results should be less than or equal to the reporting limit. A value of half the reporting limit was used for not-detected results in the difference calculation. If the analyte is not detected in the sample or the field duplicate sample, the RPD is not calculated and a quantitative evaluation is not made since neither sample had a positive result.

8.3.1 Field Duplicate Results for PCBs

A summary of the field duplicate results for samples analyzed by the mGBM (NE207_03) is presented in Table 8-3. The table includes the following information:

- The total number of field duplicate pairs is presented in the column with the heading “Total No. Field Duplicate Pairs”. The table presents the total number of field duplicate pairs for each analyte as well as the total number of field duplicate result pairs.
- The total number of the field duplicate pairs that had not-detected results in both the parent sample and field duplicate is presented in the column with the heading “Total No. Field Duplicate Pairs with NDs for Both Samples” (All of these meet field duplicate precision criteria because both results are “not-detected”). This information is also presented by analyte.
- The total number of the field duplicate pairs that had positive results in the field duplicate and/or parent sample is presented in the columns under the heading “Total No. Field Duplicate Pairs with Positives in Either Sample”. The total number (“Total No.”), the number that met criteria (“No. Meet Criteria”) and that did not meet criteria (“No. Do Not Meet Criteria”), and the percentage that met criteria (“% Meet Criteria”) and did not meet criteria (“% Do Not Meet Criteria”) are presented. This information is also presented by analyte.
- The overall percentage of results that met criteria is presented in the column with the heading “Overall % Meet Criteria”. This information is also presented by analyte.

A total of 45 field duplicate pairs were analyzed for PCB congeners by the mGBM (NE207_03); a very high percentage (99%) of the results met the field duplicate precision criteria. For Total PCBs, all of the results met the field duplicate precision criteria. For the individual PCB congeners, the percentage of results that met the field duplicate precision criteria ranged from 84% to 100%. The percentage of field duplicate pairs with positive results in either sample that met the field duplicate precision criteria was high for all analytes (96%) and for Total PCBs (100%).

8.3.2 Field Duplicate Results for Other Parameters

A summary of the field duplicate results for samples analyzed by methods 200.8, 245.1, 130.2, 160.2, and NE128_03, is presented in Table 8-4. The table includes the following information:

- For each method, the total number of field duplicate pairs is presented in the column with the heading “Total No. Field Duplicate Pairs”. The table presents the total number of field duplicate pairs for each analyte as well as the total number of field duplicate result pairs.
- For each method, the total number of the field duplicate pairs that had not-detected results in both the parent sample and field duplicate is presented in the column with the heading “Total No. Field Duplicate Pairs with NDs for Both Samples” (All these meet field duplicate precision criteria because both results are “not-detected”). This information is also presented by analyte.
- For each method, the total number of the field duplicate pairs that had positive results in the field duplicate and/or parent sample is presented in the columns under the heading “Total No. Field Duplicate Pairs with Positives in Either Sample”. The total number (“Total No.”), the number that met criteria (“No. Meet Criteria”) and that did not meet criteria (“No. Do Not Meet Criteria”), and the percentage that met criteria (“% Meet Criteria”) and did not meet criteria (“% Do Not Meet Criteria”) are presented. This information is also presented by analyte.

- For each method, the overall percentage of results that met criteria is presented in the column with the heading “Overall % Meet Criteria”. This information is also presented by analyte.

Very good precision was also demonstrated by the field duplicate pair results for total and dissolved metals and hardness (Table 8-4). A total of 15 field duplicate pairs were analyzed by methods 200.8, 245.1, and either EPA 130.2 or SM 2340C. The percentages of field duplicate results that met criteria for total and dissolved metals by 200.8 are 97% and 97%, respectively. All (100%) field duplicate results met criteria for total and dissolved mercury and hardness. Dissolved mercury was only detected in one field duplicate pair and total mercury was not detected in any field duplicate pair.

Good precision was demonstrated by the field duplicate pair results for POC and DOC and TSS (Table 8-4). A total of 41 field duplicate pairs were analyzed for POC and DOC and 100% of the results met the field duplicate precision criteria and 88% and 85% respectively, of the results met the field duplicate precision criteria. A total of 46 field duplicate pairs were analyzed for TSS and 78% of the results met field duplicate precision criteria. The TSS result in field duplicate sample RTN-070625-BD-C01 has been flagged as suspect (“S”). Sample RTN-070625-BD-C01 is a field duplicate of sample RTN-070625-WF-C01 and the duplicate TSS result is significantly different than the TSS result in the parent sample RTN-070625-WF-C01 (RPD = 199%) and from typical TSS results at Waterford. This duplicate TSS value has not been used in data interpretation.

8.4 EQUIPMENT BLANKS

Equipment blanks were collected to monitor external contamination during sample collection at the frequency described in Section 3.3.2. As previously indicated, equipment blanks were not collected for fish tissue samples. Summary statistics for the equipment blanks with analyte positive results greater than the MDL (other than individual PCB congener results) are presented in Table 8-5. Of the 50 equipment blanks collected for PCB analysis by the mGBM (NE207_03), none had detectable Total PCB concentrations above the MDL (trace

concentration level PCB congeners were detected in equipment blanks). In addition, positive results were not observed in any of the 15 equipment blanks collected for hardness. In general, trace concentrations of remaining analytes were detected in the equipment blanks associated with the water sampling program. Trace concentration levels were detected for the equipment blank total and dissolved metals analysis with calcium (total and dissolved), chromium (total and dissolved), cobalt (dissolved), copper (total and dissolved), lead (dissolved), magnesium (dissolved), sodium (dissolved), vanadium (total and dissolved), and zinc (total and dissolved) being detected in 50% or more of the blanks collected. In addition, POC was detected in 74% of the equipment blanks. The impacts of the equipment blank concentrations were assessed during the electronic data verification and manual data validation processes and affected sample results qualified as “U*”.

SECTION 9 SUMMARY

The objective of the BMP is to provide data to establish pre-dredging conditions in the Upper Hudson River. This information will be used to evaluate achievement of performance standards during remediation, and to assess changes in PCB levels in fish and water to identify recovery trends. The BMP entails the routine collection and analysis of water and fish samples, as well as the performance of several special studies to support the remedial design. Data collected during the multi-year monitoring program will be used to satisfy the DQOs established in the QAPP (QEA and ESI 2004).

The routine water sampling program was continued during 2007. Weekly routine monitoring at the six Upper Hudson River stations produced a total of 462 samples for PCBs and TSS analysis (environmental samples and duplicates) for use in establishing monthly loads and variability as a baseline for comparison during remedial action monitoring. In addition, samples for POC and DOC were collected weekly, and TAL metals samples were collected biweekly. Monitoring at the Mohawk River at Cohoes, Albany, and Poughkeepsie was performed monthly to collect samples for PCB, TSS, POC, and DOC analyses. Water quality parameter data (i.e., turbidity, DO, pH, conductivity, and temperature) were collected at all stations during each sampling event. PCB, TSS, POC, and DOC samples were collected at Waterford during six high flow events in 2007. Sampling at the historical location below the Thompson Island Dam continued in 2007.

The BMP fish program continued in 2007 in accordance with the QAPP (QEA and ESI 2004). Adult fish were sampled in the spring and yearling pumpkinseed and forage fish were sampled in the fall. During the spring sampling event, 375 adult species of black bass (largemouth and smallmouth bass), perch (yellow or white perch), and ictalurids (brown/yellow bullhead and channel/white catfish) were collected from 15 stations in the Upper Hudson River and one location in the Lower Hudson River (below the Federal Dam in Troy). During the fall sampling event, a total of 125 yearling pumpkinseed and 50 forage fish samples were collected from the stations sampled in the spring. The forage fish were composited into 50 samples for

analyses (ten composites per pool). A total of 550 samples (spring and fall) were submitted for Aroclor PCB and lipid analysis. Ten percent of the total number of fish analyzed for Aroclor PCBs was also analyzed for congener-specific PCBs. Field measurements and observations were recorded for fish collected to assess overall fish condition in each pool.

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TABLES

Table 2-1. Hudson River water monitoring summary

Station	Hudson RM	Sample Type ¹	Analyte and Sampling Frequency		
			PCB's, TSS, Suspended OC, Dissolved OC	Additional TSS	TAL Metals
Bakers Falls	197	Centroid (~center channel)	Year-round/weekly		May-Nov./bi-weekly
Rogers Island	194.2	Centroid (~center of East and West channels)	Year-round/weekly		May-Nov./bi-weekly
Thompson Island ²	187.5	Transect (6 loc.)	March-Nov./weekly	Weekly (May-June)	May-Nov./bi-weekly
Schuylerville	181.4	Transect (6 loc.)	Year-round/weekly	Weekly (May-June)	May-Nov./bi-weekly
Stillwater	168.4	Transect (5 loc.)	May-Nov./weekly		May-Nov./bi-weekly
Waterford	156	Transect (5 loc.)	Year-round/weekly		May-Nov./bi-weekly
		Centroid (~center channel)	During high flow		
Mohawk River at Cohoes	NA	Transect (5 loc.)	Year-round/monthly		
Albany/ Troy ³	145	Centroid (~center channel)	May-Nov./monthly		
Poughkeepsie ³	75	Centroid (~center channel)	May-Nov./monthly		

Note: Water Quality (WQ) measurements that include temperature, specific conductivity, pH, turbidity and dissolved oxygen were taken for each water sample using a probe.

¹ A single composite sample was generated for each station.

² The historical single point sampling location at TID (TID-PRW2) is sampled simultaneously with the transect sampling once per month.

³ Only PCB and TSS were measured at the Lower Hudson stations.

Table 2-2. Fish BMP sampling locations and actual number of each species per location - spring 2007.

Location	Site Code	Number of Adult Fish				Total	Notes
		Sample Date	SMB/LMB	BB/YB	YP/WP		
Feeder Dam	FD1	5/29/2007	20	20	20	60	transects 65, 66, 68, 70, 73, 74, 76, 77, 78
Feeder Dam Total			20	20	20	60	
Thompson Island Pool	TD1	5/22/2007	5	5	5	15	transects 37, 42, 43, 45
	TD2	5/22/2007	5	5	5	15	near RM 193; 3588 shocking seconds
	TD3	5/21/2007	5	5	5	15	transect 63
	TD4	5/21/2007	5	5	5	15	transect 54
	TD5	5/21/2007	10	10	10	30	transects 46, 47
TIP Totals			30	30	30	90	
Ft.Miller/Northumberland Pools	ND1	5/22/2007	5	5	2	12	6271 shocking seconds; short 3 yellow perch; very little vegetative growth
	ND2	5/22/2007	5	1	1	7	4119 shocking seconds; short 4 bullhead; 4 perch; very little vegetative growth
	ND3	5/22/2007	5	9	9	23	2334 shocking seconds; captured additional yellow perch and bullhead (9 each) to cover lower numbers in ND1 and ND2
	ND5	5/23/07; 5/31/07	10	10	13	33	7209 shocking seconds first day (short 4 bullhead); no time recorded for second day of sampling - all 4 missing bullhead captured
FM/ND Totals			25	25	25	75	
Stillwater Pool	SW1	5/23/2007	5	5	5	15	transects 20, 22, 23, 56
	SW2	5/24/2007	5	5	5	15	transect 29
	SW3**	5/24/2007	10	10	10	30	transects 24, 25, 35
	SW4	5/24/2007	4	5	5	14	transects 31, 32, 33
	SW5	5/24/2007	6	5	5	16	just above Stillwater Dam; 4078 shocking seconds during afternoon; 2037 shocking seconds nighttime
SW Totals			30	30	30	90	
Albany/Troy	AT1	5/29/2007	20	20	20	60	below dam to Green Island Bridge; 8542 shocking seconds
Albany/Troy Totals			20	20	20	60	

Notes:

*Historical DEC location behind Griffin Island

**Historical DEC location near Coveville

SMB/LMB - equal numbers from each location when possible

Albany/Troy: 20 White perch (2 yellow perch captured, under size limit); 3 brown bullhead; 4 channel catfish; 13 white catfish

ND4: Abandoned in 2004

Table 2-3. Fish BMP sampling locations and number of each species per location (2007 fall sampling).

Location	Site Code Size (TL)	Sample Date	Number of Fish ²		Total	Shocking Seconds	Site description	Notes
			PS 70-150 mm	STS ¹				
Feeder Dam	FD1	10/5/07	20	10	30	4754	feeder dam pool near boat launch	
Feeder Dam Total					30			
Thompson Island Pool	TD1	9/11/07	5	2	7	2448	near Rogers Island	
	TD2	9/11/07	5	2	7	2621	near RM 193	
	TD3	9/11/07	5	2	7	1312	just upstream of SnookKill - behind three sisters islands on eastern shore	
	TD4	9/11/07	5	2	7	6720	northern end of Griffin Island	
	TD5 *	9/11/07	10	2	12	2027	near RM 190 - along eastern shoreline	
TIP Totals			30	10	40			
Ft.Miller/Northumberland Pools	ND1		0	0	0		from Thompson Island to small island below	access not available in landlocked section
	ND2		0	0	0		downstream end of pool	access not available in landlocked section
	ND3	10/4/07	2	5	7	7903	below Fort Miller dam to two small islands	pumpkinseed very difficult to find here; remaining numbers captured from ND5
	ND4	10/4/07			0		abandoned	
	ND5	10/4/07; 10/5/07	23	5	28	4562; 4285	wetland area above Northumberland Dam	sample size increased to account for no samples in ND1 and ND2 and low numbers of pumpkinseed in ND3
FM/ND Totals			25	10	35			
Stillwater Pool	SW1	9/12/07	5	2	7	4540	below Battenkill	
	SW2	10/3/07	5	2	7	3194	approx. 3/4 mile upstream of Coveville	
	SW3	10/3/07	5	2	7	1967	Coveville	
	SW4	10/5/07	5	2	7	1706	near RM 173; in cove near large culvert	
	SW5 **	10/5/07	10	2	12	1697	just above Stillwater Dam	
SW Totals			30	10	40			
Albany/Troy	AT1	10/4/07	20	10	30	4319; 2071	Albany South Turning Basin and area on east shore near Dunn Memorial Bridge	shocking seconds for Turning Basin and Bridge area, respectively. Pumpkinseed sparse at Turning Basin, captured in vegetation along shore further upstream
Albany/Troy Totals			20	10	30			

Notes:

¹. Substitute species for spottail shiner included: golden shiner, mimic shiner, and spotfin shiner

². Number of composite samples for forage fish

*Historical DEC location across from Griffin Is

**Historical DEC location near Stillwater Dam

Table 3-1 - Summary of Green Bay Congener Method PE Homolog and Total PE Results

Homolog Group	PE	PE Concentration ng/L	Lower Control Limit (70%R) ng/L	Upper Control Limit (130%R) ng/L	Weight %	Conc. ng/L	% Recovery
Monochlorobiphenyl	8-L	0.24	0.17	0.31	2.55%	0.21	85.5
Dichlorobiphenyl	8-L	0.96	0.67	1.25	11.16%	0.90	93.6
Trichlorobiphenyl	8-L	1.80	1.26	2.34	28.79%	2.32	128.8
Tetrachlorobiphenyl	8-L	2.64	1.85	3.43	28.37%	2.28	86.5
Pentachlorobiphenyl	8-L	1.44	1.01	1.87	21.71%	1.75	121.4
Hexachlorobiphenyl	8-L	0.72	0.50	0.94	7.42%	0.60	83.0
Total PCB	8-L	7.80	5.46	10.14		7.93	101.6
Monochlorobiphenyl	1-L	6.06	4.24	7.88	2.38%	4.37	72.1
Dichlorobiphenyl	1-L	24.16	16.91	31.41	10.30%	18.90	78.2
Trichlorobiphenyl	1-L	45.30	31.71	58.89	28.01%	51.40	113.5
Tetrachlorobiphenyl	1-L	66.44	46.51	86.37	28.90%	53.03	79.8
Pentachlorobiphenyl	1-L	36.24	25.37	47.11	22.53%	41.34	114.1
Hexachlorobiphenyl	1-L	18.12	12.68	23.56	7.87%	14.44	79.7
Total PCB	1-L	196.32	137.42	255.22		180.48	91.9

Table 4-1. Baseline water program PCB summary statistics.

Location	Sample Counts		Frequency Detected (%)	PCBs (ng/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
Bakers Falls	43	4	47	1.07	1.64	2.20	0.07
Rogers Island	40	8	100	1.12	3.13	6.73	0.20
Thompson Island Dam	31	4	97	11.48	41.32	121.56	4.38
Schuylerville (Transect)	42	8	96	9.73	38.77	123.44	3.80
Stillwater	31	7	100	12.53	38.68	109.11	3.63
Waterford	43	10	91	10.12	27.15	62.46	1.74
Mohawk River at Cohoes	9	0	0	--	--	--	--
LHR Albany	7	2	67	13.41	18.83	28.34	2.25
LHR Poughkeepsie	7	0	100	10.27	24.52	57.39	5.96

Note:

Statistics based on detectable concentrations only.

Table 4-2. Baseline water program TSS summary statistics.

Location	Sample Counts		Frequency Detected (%)	TSS (mg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
Bakers Falls	43	4	72	0.90	2.66	14.50	0.49
Rogers Island	40	8	56	0.97	2.55	7.20	0.32
Thompson Island Dam	31	4	54	0.90	4.24	16.10	0.83
Schuylerville (Transect)	42	8	66	0.98	7.23	39.10	1.68
Stillwater	31	7	71	1.10	3.31	23.00	0.79
Waterford	43	10	94	1.27	10.60	72.50	2.47
Mohawk River at Cohoes	9	0	100	1.41	23.08	132.00	13.98
LHR Albany	7	2	100	1.00	10.71	28.00	3.15
LHR Poughkeepsie	7	0	100	12.50	19.20	24.20	1.56

Note:

Statistics based on detectable concentrations only.

Table 4-3. Baseline water program POC/DOC summary statistics.

Location	Sample Counts		Frequency Detected (%)	Organic Carbon (mg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
Dissolved Total Organic Carbon							
Bakers Falls	43	4	96	2.70	4.85	10.80	0.30
Rogers Island	40	8	96	2.76	5.20	15.70	0.33
Thompson Island Dam	31	4	97	2.78	5.27	11.50	0.39
Schuylerville (Transect)	42	8	98	2.69	4.69	12.00	0.31
Stillwater	31	7	97	2.56	5.64	13.70	0.55
Waterford	43	10	96	2.43	5.03	15.20	0.46
Mohawk River at Cohoes	9	0	89	2.22	7.82	22.20	3.11
LHR Albany	1	0	100	3.10	3.10	3.10	--
LHR Poughkeepsie	1	0	100	3.04	3.04	3.04	--
Particulate Organic Carbon							
Bakers Falls	43	4	36	0.19	0.43	0.79	0.05
Rogers Island	40	8	29	0.21	0.41	0.72	0.05
Thompson Island Dam	31	4	17	0.17	0.42	1.28	0.17
Schuylerville (Transect)	42	8	30	0.13	0.59	1.40	0.13
Stillwater	31	7	24	0.20	0.34	0.86	0.07
Waterford	43	10	49	0.13	0.63	2.11	0.10
Mohawk River at Cohoes	9	0	44	0.52	1.16	2.76	0.54
LHR Albany	1	0	0	--	--	--	--
LHR Poughkeepsie	1	0	100	0.69	0.69	0.69	--

Note:

Statistics based on detectable concentrations only.

Table 4-4. Baseline water program total TAL metals summary statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals ($\mu\text{g/L}$)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Aluminum							
Bakers Falls	15	1	100	23.90	49.24	121.00	6.35
Rogers Island	15	1	100	20.80	47.11	91.60	5.14
Thompson Island Dam	15	3	100	22.70	72.52	230.00	15.73
Schuylerville (Transect)	15	3	100	9.80	53.15	101.00	6.77
Stillwater	15	5	100	25.10	58.36	121.00	6.56
Waterford	15	2	100	37.00	98.72	329.00	17.49
TAL - Antimony							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	6	0.15	0.15	0.15	--
Thompson Island Dam	15	3	28	0.09	0.13	0.22	0.03
Schuylerville (Transect)	15	3	33	0.08	0.17	0.30	0.04
Stillwater	15	5	35	0.08	0.18	0.29	0.03
Waterford	15	2	65	0.12	0.18	0.25	0.01
TAL - Arsenic							
Bakers Falls	15	1	25	0.12	0.21	0.31	0.05
Rogers Island	15	1	19	0.12	0.20	0.26	0.04
Thompson Island Dam	15	3	28	0.12	0.25	0.39	0.06
Schuylerville (Transect)	15	3	33	0.10	0.21	0.27	0.03
Stillwater	15	5	40	0.17	0.27	0.37	0.03
Waterford	15	2	41	0.19	0.31	0.59	0.05
TAL - Barium							
Bakers Falls	15	1	100	7.30	9.39	15.00	0.46
Rogers Island	15	1	100	7.50	9.07	12.10	0.32
Thompson Island Dam	15	3	100	7.60	9.78	11.50	0.27
Schuylerville (Transect)	15	3	100	8.00	10.70	14.70	0.39
Stillwater	15	5	100	8.60	11.47	17.50	0.45
Waterford	15	2	100	10.40	14.84	23.00	0.68

Table 4-4. Baseline water program total TAL metals summary statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals ($\mu\text{g/L}$)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Beryllium							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	0	--	--	--	--
TAL - Cadmium							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	5	0.91	0.91	0.91	--
Waterford	15	2	0	--	--	--	--
TAL - Calcium							
Bakers Falls	15	1	100	5790.00	10434.38	16100.00	600.12
Rogers Island	15	1	100	5810.00	9736.25	12700.00	447.18
Thompson Island Dam	15	3	100	6530.00	10441.11	12800.00	383.06
Schuylerville (Transect)	15	3	100	6490.00	12004.44	16800.00	576.62
Stillwater	15	5	100	7230.00	12905.00	19600.00	614.09
Waterford	15	2	100	9500.00	20052.94	33100.00	1256.66
TAL - Chromium							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	0	--	--	--	--

Table 4-4. Baseline water program total TAL metals summary statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals ($\mu\text{g/L}$)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Cobalt							
Bakers Falls	15	1	75	0.03	0.05	0.09	0.01
Rogers Island	15	1	75	0.02	0.05	0.08	0.01
Thompson Island Dam	15	3	67	0.04	0.08	0.14	0.01
Schuylerville (Transect)	15	3	78	0.03	0.20	1.80	0.12
Stillwater	15	5	75	0.04	0.07	0.12	0.01
Waterford	15	2	82	0.06	0.13	0.31	0.02
TAL - Copper							
Bakers Falls	15	1	19	1.60	2.43	3.30	0.49
Rogers Island	15	1	13	2.30	2.90	3.50	0.60
Thompson Island Dam	15	3	11	1.20	1.20	1.20	0.00
Schuylerville (Transect)	15	3	33	1.40	2.17	3.30	0.29
Stillwater	15	5	25	1.30	1.70	2.00	0.11
Waterford	15	2	53	1.50	2.03	3.30	0.19
TAL - Iron							
Bakers Falls	15	1	100	80.70	115.92	307.00	14.08
Rogers Island	15	1	100	65.50	103.86	207.00	8.48
Thompson Island Dam	15	3	100	62.40	150.36	370.00	22.77
Schuylerville (Transect)	15	3	100	30.30	124.53	217.00	11.99
Stillwater	15	5	100	72.80	144.90	267.00	12.30
Waterford	15	2	100	73.90	207.52	514.00	26.41
TAL - Lead							
Bakers Falls	15	1	50	0.07	0.13	0.17	0.01
Rogers Island	15	1	63	0.06	0.16	0.33	0.02
Thompson Island Dam	15	3	67	0.11	0.18	0.30	0.02
Schuylerville (Transect)	15	3	61	0.07	0.20	0.28	0.02
Stillwater	15	5	60	0.09	0.23	0.42	0.03
Waterford	15	2	53	0.24	0.33	0.52	0.03

Table 4-4. Baseline water program total TAL metals summary statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals (µg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Magnesium							
Bakers Falls	15	1	100	846.00	1321.94	2220.00	75.37
Rogers Island	15	1	100	871.00	1281.63	1800.00	51.69
Thompson Island Dam	15	3	100	1120.00	1505.00	2030.00	53.69
Schuylerville (Transect)	15	3	100	1230.00	2008.89	2600.00	83.58
Stillwater	15	5	100	1440.00	2459.00	3820.00	126.42
Waterford	15	2	100	1940.00	3482.35	6160.00	220.19
TAL - Manganese							
Bakers Falls	15	1	100	17.90	29.14	45.70	1.84
Rogers Island	15	1	100	17.20	25.41	40.00	1.60
Thompson Island Dam	15	3	100	18.50	24.22	33.20	0.97
Schuylerville (Transect)	15	3	100	9.10	20.93	26.70	1.03
Stillwater	15	5	100	11.80	21.40	34.50	1.35
Waterford	15	2	100	24.20	31.05	48.20	1.63
TAL - Mercury							
Bakers Falls	15	1	6	0.06	0.06	0.06	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	6	0.06	0.06	0.06	--
Schuylerville (Transect)	15	3	6	0.07	0.07	0.07	--
Stillwater	15	5	5	0.06	0.06	0.06	--
Waterford	15	2	0	--	--	--	--
TAL - Nickel							
Bakers Falls	15	1	81	0.13	0.25	0.38	0.03
Rogers Island	15	1	81	0.14	0.26	0.37	0.02
Thompson Island Dam	15	3	78	0.17	0.33	0.55	0.04
Schuylerville (Transect)	15	3	78	0.13	0.32	0.51	0.03
Stillwater	15	5	80	0.18	0.30	0.46	0.02
Waterford	15	2	88	0.26	0.49	0.99	0.06

Table 4-4. Baseline water program total TAL metals summary statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals (µg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Potassium							
Bakers Falls	15	1	94	350.00	565.80	751.00	30.98
Rogers Island	15	1	94	358.00	526.00	648.00	24.18
Thompson Island Dam	15	3	89	381.00	590.63	731.00	25.03
Schuylerville (Transect)	15	3	94	364.00	610.00	802.00	28.17
Stillwater	15	5	95	408.00	644.53	889.00	30.82
Waterford	15	2	94	482.00	865.50	1180.00	46.01
TAL - Selenium							
Bakers Falls	15	1	6	0.32	0.32	0.32	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	6	0.19	0.19	0.19	--
Schuylerville (Transect)	15	3	6	0.46	0.46	0.46	--
Stillwater	15	5	10	0.18	0.24	0.30	0.06
Waterford	15	2	18	0.20	0.25	0.33	0.04
TAL - Silver							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	0	--	--	--	--
TAL - Sodium							
Bakers Falls	15	1	100	4800.00	7529.38	9770.00	360.96
Rogers Island	15	1	100	4700.00	7046.25	9060.00	281.01
Thompson Island Dam	15	3	100	5070.00	7610.00	9660.00	253.62
Schuylerville (Transect)	15	3	100	4800.00	7615.56	10900.00	393.16
Stillwater	15	5	100	5040.00	8209.50	11700.00	364.74
Waterford	15	2	100	6210.00	11227.06	17100.00	620.31

Table 4-4. Baseline water program total TAL metals summary statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals ($\mu\text{g/L}$)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Thallium							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	13	0.02	0.03	0.03	0.00
Thompson Island Dam	15	3	39	0.02	0.12	0.24	0.03
Schuylerville (Transect)	15	3	22	0.02	0.07	0.18	0.04
Stillwater	15	5	20	0.03	0.05	0.09	0.01
Waterford	15	2	53	0.03	0.12	0.35	0.04
TAL - Vanadium							
Bakers Falls	15	1	38	0.13	0.36	0.90	0.12
Rogers Island	15	1	25	0.18	0.34	0.43	0.06
Thompson Island Dam	15	3	33	0.17	0.60	0.98	0.12
Schuylerville (Transect)	15	3	22	0.17	0.53	1.10	0.20
Stillwater	15	5	30	0.18	0.36	0.76	0.09
Waterford	15	2	41	0.17	0.55	1.10	0.12
TAL - Zinc							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	6	7.60	7.60	7.60	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	18	9.00	30.03	71.40	20.68

Note:

Statistics based on detectable concentrations only.

Table 4-5. Baseline Water Program Dissolved TAL Metals Summary Statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals (µg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Aluminum (DISS)							
Bakers Falls	15	1	81	11.8	29.48	59.20	3.79
Rogers Island	15	1	88	12.2	27.95	57.60	3.60
Thompson Island Dam	15	3	78	11.3	29.00	68.60	4.41
Schuylerville (Transect)	15	3	78	11.4	26.93	58.70	3.98
Stillwater	15	5	65	9.1	33.78	124.00	8.43
Waterford	15	2	76	9.8	22.28	46.90	2.98
TAL - Antimony (DISS)							
Bakers Falls	15	1	19	0.074	0.10	0.12	0.01
Rogers Island	15	1	31	0.043	0.19	0.56	0.09
Thompson Island Dam	15	3	50	0.075	0.13	0.24	0.02
Schuylerville (Transect)	15	3	44	0.051	0.19	0.38	0.04
Stillwater	15	5	40	0.058	0.19	0.33	0.04
Waterford	15	2	59	0.14	0.22	0.30	0.02
TAL - Arsenic (DISS)							
Bakers Falls	15	1	25	0.12	0.17	0.25	0.03
Rogers Island	15	1	38	0.12	0.17	0.28	0.02
Thompson Island Dam	15	3	28	0.11	0.16	0.19	0.01
Schuylerville (Transect)	15	3	44	0.12	0.21	0.27	0.02
Stillwater	15	5	35	0.12	0.21	0.32	0.03
Waterford	15	2	53	0.15	0.30	0.46	0.04
TAL - Barium (DISS)							
Bakers Falls	15	1	100	6.8	8.58	10.10	0.26
Rogers Island	15	1	100	6.9	8.61	10.10	0.24
Thompson Island Dam	15	3	100	6.7	9.23	10.80	0.25
Schuylerville (Transect)	15	3	100	7.3	10.12	12.80	0.32
Stillwater	15	5	100	7.8	10.98	15.50	0.41
Waterford	15	2	100	9	13.61	16.40	0.44

Table 4-5. Baseline Water Program Dissolved TAL Metals Summary Statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals ($\mu\text{g/L}$)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Beryllium (DISS)							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	12	0.055	0.06	0.07	0.01
TAL - Cadmium (DISS)							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	0	--	--	--	--
TAL - Calcium (DISS)							
Bakers Falls	15	1	100	5790	9971.88	12000.00	469.10
Rogers Island	15	1	100	5860	9670.00	11300.00	419.19
Thompson Island Dam	15	3	100	6510	10574.44	12200.00	398.66
Schuylerville (Transect)	15	3	100	6560	11825.00	14400.00	501.20
Stillwater	15	5	100	7220	12630.50	16600.00	510.34
Waterford	15	2	100	9380	19681.18	27600.00	971.12
TAL - Chromium (DISS)							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	0	--	--	--	--

Table 4-5. Baseline Water Program Dissolved TAL Metals Summary Statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals ($\mu\text{g/L}$)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Cobalt (DISS)							
Bakers Falls	15	1	81	0.07	1.39	2.00	0.14
Rogers Island	15	1	75	0.079	1.40	2.40	0.18
Thompson Island Dam	15	3	78	1.3	1.69	2.20	0.08
Schuylerville (Transect)	15	3	78	0.26	1.50	2.10	0.16
Stillwater	15	5	75	0.25	1.25	1.80	0.14
Waterford	15	2	65	0.93	1.48	2.10	0.11
TAL - Copper (DISS)							
Bakers Falls	15	1	6	1.2	1.20	1.20	--
Rogers Island	15	1	6	3.8	3.80	3.80	--
Thompson Island Dam	15	3	6	1.3	1.30	1.30	--
Schuylerville (Transect)	15	3	22	1.3	1.60	2.00	0.18
Stillwater	15	5	15	1.2	1.53	2.00	0.24
Waterford	15	2	29	1.3	1.60	2.00	0.11
TAL - Iron (DISS)							
Bakers Falls	15	1	100	19.2	43.44	149.00	7.78
Rogers Island	15	1	94	19.7	37.45	66.10	3.59
Thompson Island Dam	15	3	100	25.1	61.17	199.00	9.11
Schuylerville (Transect)	15	3	100	11.3	50.92	189.00	8.81
Stillwater	15	5	95	15.9	63.27	228.00	12.16
Waterford	15	2	82	13.3	48.31	151.00	9.35
TAL - Lead (DISS)							
Bakers Falls	15	1	31	0.039	0.06	0.08	0.01
Rogers Island	15	1	38	0.041	0.07	0.14	0.02
Thompson Island Dam	15	3	50	0.05	0.16	0.61	0.07
Schuylerville (Transect)	15	3	33	0.063	0.16	0.35	0.04
Stillwater	15	5	25	0.043	0.11	0.21	0.03
Waterford	15	2	24	0.048	0.08	0.14	0.02

Table 4-5. Baseline Water Program Dissolved TAL Metals Summary Statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals ($\mu\text{g/L}$)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Magnesium (DISS)							
Bakers Falls	15	1	100	854	1254.44	1520.00	43.81
Rogers Island	15	1	100	871	1267.81	1550.00	43.81
Thompson Island Dam	15	3	100	1160	1520.56	1950.00	49.13
Schuylerville (Transect)	15	3	100	1270	1991.11	2960.00	87.20
Stillwater	15	5	100	1420	2394.50	3410.00	104.60
Waterford	15	2	100	1890	3423.53	4350.00	157.55
TAL - Manganese (DISS)							
Bakers Falls	15	1	100	11.2	17.78	26.20	1.14
Rogers Island	15	1	100	5.4	13.94	22.30	0.96
Thompson Island Dam	15	3	100	13	18.23	26.70	0.88
Schuylerville (Transect)	15	3	100	9.3	14.71	26.80	1.15
Stillwater	15	5	100	3.8	13.18	25.80	1.39
Waterford	15	2	94	1.2	9.57	25.00	1.81
TAL - Mercury (DISS)							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	6	0.15	0.15	0.15	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	6	0.055	0.06	0.06	--
TAL - Nickel (DISS)							
Bakers Falls	15	1	50	0.31	0.41	0.55	0.03
Rogers Island	15	1	44	0.3	0.45	0.71	0.06
Thompson Island Dam	15	3	39	0.38	0.53	0.70	0.05
Schuylerville (Transect)	15	3	50	0.32	0.53	0.77	0.05
Stillwater	15	5	50	0.24	0.46	0.80	0.05
Waterford	15	2	41	0.23	0.51	0.72	0.07

Table 4-5. Baseline Water Program Dissolved TAL Metals Summary Statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals (µg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Potassium (DISS)							
Bakers Falls	15	1	94	349	542.80	646.00	27.22
Rogers Island	15	1	94	348	522.60	699.00	24.85
Thompson Island Dam	15	3	89	381	591.94	775.00	26.06
Schuylerville (Transect)	15	3	94	358	596.12	747.00	26.14
Stillwater	15	5	95	390	626.68	964.00	29.98
Waterford	15	2	94	465	842.81	1160.00	40.40
TAL - Selenium (DISS)							
Bakers Falls	15	1	6	0.18	0.18	0.18	--
Rogers Island	15	1	6	0.3	0.30	0.30	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	6	0.2	0.20	0.20	--
Stillwater	15	5	15	0.21	0.22	0.24	0.01
Waterford	15	2	24	0.21	0.31	0.40	0.04
TAL - Silver (DISS)							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	0	--	--	--	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	0	--	--	--	--
TAL - Sodium (DISS)							
Bakers Falls	15	1	100	4790	7291.88	9100.00	330.00
Rogers Island	15	1	100	4650	6984.38	8780.00	290.15
Thompson Island Dam	15	3	100	5110	7651.67	9360.00	264.27
Schuylerville (Transect)	15	3	100	4860	7501.11	9100.00	352.27
Stillwater	15	5	100	5050	8100.00	11700.00	331.75
Waterford	15	2	100	6150	11154.12	14100.00	483.86

Table 4-5. Baseline Water Program Dissolved TAL Metals Summary Statistics.

Location	Sample Counts		Frequency Detected (%)	TAL Metals ($\mu\text{g/L}$)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
TAL - Thallium (DISS)							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	0	--	--	--	--
Thompson Island Dam	15	3	33	0.043	0.17	0.33	0.04
Schuylerville (Transect)	15	3	33	0.021	0.06	0.20	0.03
Stillwater	15	5	20	0.03	0.06	0.13	0.02
Waterford	15	2	29	0.027	0.15	0.36	0.06
TAL - Vanadium (DISS)							
Bakers Falls	15	1	19	0.15	0.27	0.37	0.06
Rogers Island	15	1	25	0.13	0.29	0.51	0.08
Thompson Island Dam	15	3	28	0.16	0.38	0.59	0.07
Schuylerville (Transect)	15	3	22	0.15	0.43	0.94	0.17
Stillwater	15	5	30	0.12	0.28	0.58	0.07
Waterford	15	2	29	0.11	0.25	0.56	0.09
TAL - Zinc (DISS)							
Bakers Falls	15	1	0	--	--	--	--
Rogers Island	15	1	6	19.4	19.40	19.40	--
Thompson Island Dam	15	3	6	22.9	22.90	22.90	--
Schuylerville (Transect)	15	3	0	--	--	--	--
Stillwater	15	5	0	--	--	--	--
Waterford	15	2	0	--	--	--	--

Notes:

Statistics based on detectable concentrations only.

Table 4-6. Baseline water quality parameter summary statistics.

Location	Specific Conductance			Temperature			Turbidity			pH			Dissolved Oxygen		
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
Bakers Falls	0.047	0.095	0.128	0.0	13.8	25.1	0.0	0.9	6.0	6.52	7.30	7.82	6.98	11.17	18.67
Rogers Island	0.048	0.095	0.127	0.1	13.8	26.0	0.1	0.9	5.5	6.76	7.47	8.15	8.04	11.34	20.02
Thompson Island (PRW2)	0.071	0.102	0.131	3.3	17.5	24.4	0.0	5.5	31.2	7.44	7.75	8.05	8.51	10.85	16.78
Thompson Island Dam	0.057	0.109	0.14	3.3	18.3	28.2	0.2	2.2	15.2	6.74	7.40	8.81	6.81	9.62	13.29
Schuylerville (Transect)	0.055	0.119	0.233	0.1	14.8	26.6	0.0	3.6	47.1	6.80	7.58	8.40	7.34	10.79	21.32
Stillwater	0.078	0.135	0.226	3.7	18.6	27.5	0.1	3.3	50.8	6.91	7.48	7.99	6.85	9.27	13.63
Waterford	0.078	0.168	0.358	0.2	12.8	27.5	1.1	17.4	191.0	6.64	7.63	8.23	7.55	11.41	21.43
Mohawk River at Cohoes	0.194	0.294	0.383	3.0	15.5	26.0	0.5	25.5	153.1	6.90	7.81	8.47	8.66	11.92	15.34
LHR Albany	0.169	0.227	0.292	3.6	17.4	25.3	1.6	17.3	69.0	6.63	7.35	8.07	6.82	10.74	14.63
LHR Poughkeepsie	0.163	0.276	0.502	5.4	19.6	25.6	11.8	24.4	56.7	7.01	7.35	8.00	6.27	8.99	14.29

Notes:

NC - Not collected.

Table 5-1. Aroclor PCB summary statistics for black bass.

Species	Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
Largemouth bass	Feeder Dam	1	11	0.04	ND	0.13	0.02
	Thompson Island Pool	3	1	7.34	7.34	7.34	-
	Thompson Island Pool	5	10	1.51	0.70	2.96	0.51
	Northumberland/Fort Miller	3	2	1.93	1.62	2.23	0.60
	Northumberland/Fort Miller	5	6	1.55	0.69	3.09	0.77
	Stillwater	1	1	2.19	2.19	2.19	-
	Stillwater	2	4	1.91	1.24	2.81	0.66
	Stillwater	3	10	0.26	0.02	1.18	0.21
	Stillwater	4	2	0.80	0.41	1.18	0.77
	Albany/Troy	1	1	1.01	1.01	1.01	-
Smallmouth bass	Feeder Dam	1	9	0.08	ND	0.43	0.09
	Thompson Island Pool	1	5	1.43	0.54	3.49	1.05
	Thompson Island Pool	2	5	2.51	1.29	3.65	0.91
	Thompson Island Pool	3	4	4.34	2.27	6.67	2.00
	Thompson Island Pool	4	5	2.07	0.68	5.96	1.98
	Northumberland/Fort Miller	1	5	5.25	2.67	11.83	3.38
	Northumberland/Fort Miller	2	5	2.24	0.80	4.21	1.22
	Northumberland/Fort Miller	3	3	2.49	0.69	4.11	1.98
	Northumberland/Fort Miller	5	4	1.32	0.04	2.40	0.98
	Stillwater	1	4	2.44	1.90	2.74	0.37
	Stillwater	2	1	1.89	1.89	1.89	-
	Stillwater	4	2	2.20	1.95	2.46	0.52
	Stillwater	5	6	0.38	0.30	0.43	0.04
	Albany/Troy	1	19	0.77	0.11	2.59	0.27

*Notes:**Prep: fillet**Non-detect values set to half method detection limit to calculate average and 2 SE.**ND = Non Detect*

Table 5-2. Congener-specific PCB summary statistics for black bass.

Species	Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
Largemouth bass	Feeder Dam	1	1	0.03	0.03	0.03	-
	Thompson Island Pool	3	1	5.54	5.54	5.54	-
	Thompson Island Pool	5	1	0.98	0.98	0.98	-
	Northumberland/Fort Miller	5	1	0.91	0.91	0.91	-
	Stillwater	2	1	1.79	1.79	1.79	-
	Stillwater	3	1	0.19	0.19	0.19	-
	Albany/Troy	1	1	1.00	1.00	1.00	-
Smallmouth bass	Feeder Dam	1	1	0.06	0.06	0.06	-
	Thompson Island Pool	2	1	1.55	1.55	1.55	-
	Thompson Island Pool	4	1	4.89	4.89	4.89	-
	Northumberland/Fort Miller	2	1	3.18	3.18	3.18	-
	Stillwater	1	1	1.59	1.59	1.59	-
	Stillwater	4	1	1.49	1.49	1.49	-
	Albany/Troy	1	1	0.13	0.13	0.13	-

Notes:

Prep = fillet

Table 5-3. Aroclor PCB summary statistics for ictalurids.

Species	Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
Brown bullhead	Feeder Dam	1	12	0.02	ND	0.14	0.02
	Thompson Island Pool	1	4	5.57	1.14	9.69	3.50
	Thompson Island Pool	2	5	3.45	1.44	7.23	1.99
	Thompson Island Pool	3	5	5.57	2.32	9.03	2.85
	Thompson Island Pool	4	5	4.04	2.22	8.37	2.36
	Thompson Island Pool	5	7	3.46	1.86	5.64	1.00
	Northumberland/Fort Miller	1	5	3.56	0.71	8.78	2.89
	Northumberland/Fort Miller	2	1	4.10	4.10	4.10	-
	Northumberland/Fort Miller	3	9	2.56	0.80	7.78	1.42
	Northumberland/Fort Miller	5	9	3.40	1.22	8.26	1.42
	Stillwater	1	4	3.92	2.01	6.05	1.95
	Stillwater	2	5	5.94	1.94	11.23	3.55
	Stillwater	3	9	2.14	0.86	3.92	0.65
	Stillwater	4	5	2.46	0.54	4.51	1.37
	Stillwater	5	5	2.25	0.90	5.09	1.62
	Albany/Troy	1	3	0.58	0.21	1.26	0.68
Channel catfish	Albany/Troy	1	4	3.26	1.58	5.73	1.75
White catfish	Albany/Troy	1	13	2.17	0.71	6.11	0.82
Yellow bullhead	Feeder Dam	1	8	0.06	ND	0.39	0.09
	Thompson Island Pool	1	1	3.76	3.76	3.76	-
	Thompson Island Pool	5	3	1.21	0.81	1.64	0.48
	Northumberland/Fort Miller	5	1	3.12	3.12	3.12	-
	Stillwater	1	1	3.09	3.09	3.09	-
	Stillwater	3	1	0.27	0.27	0.27	-

Notes:

Prep: fillet

Non-detect values set to half method detection limit to calculate average and 2 SE.

ND = Non Detect

Table 5-4. Congener-specific PCB summary statistics for ictalurids.

Species	Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
Brown bullhead	Feeder Dam	1	1	0.02	0.02	0.02	-
	Thompson Island Pool	3	1	2.10	2.10	2.10	-
	Thompson Island Pool	5	1	1.52	1.52	1.52	-
	Northumberland/Fort Miller	1	1	1.75	1.75	1.75	-
	Northumberland/Fort Miller	3	1	2.17	2.17	2.17	-
	Stillwater	1	1	3.60	3.60	3.60	-
	Stillwater	5	1	3.44	3.44	3.44	-
	Albany/Troy	1	2	0.21	0.19	0.23	0.04
Channel catfish	Albany/Troy	1	1	2.80	2.80	2.80	-
White catfish	Albany/Troy	1	1	0.86	0.86	0.86	-
Yellow bullhead	Feeder Dam	1	1	0.19	0.19	0.19	-
	Northumberland/Fort Miller	5	1	2.11	2.11	2.11	-

Notes:

Prep = fillet

Table 5-5. Aroclor PCB summary statistics for perch.

Species	Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
White perch	Albany/Troy	1	20	1.59	0.26	2.72	0.36
Yellow perch	Feeder Dam	1	20	0.01	ND	ND	0.00
	Thompson Island Pool	1	5	1.42	0.08	3.12	0.98
	Thompson Island Pool	2	5	0.63	0.32	1.11	0.29
	Thompson Island Pool	3	5	1.23	0.65	2.73	0.78
	Thompson Island Pool	4	5	0.53	0.35	1.08	0.27
	Thompson Island Pool	5	10	0.61	0.24	2.14	0.35
	Northumberland/Fort Miller	1	2	0.76	0.76	0.77	0.02
	Northumberland/Fort Miller	2	1	0.75	0.75	0.75	-
	Northumberland/Fort Miller	3	9	0.50	0.25	0.85	0.14
	Northumberland/Fort Miller	5	13	0.30	0.09	0.58	0.09
	Stillwater	1	5	0.35	0.13	0.75	0.24
	Stillwater	2	5	0.44	0.24	0.64	0.13
	Stillwater	3	10	0.53	0.02	1.61	0.31
	Stillwater	4	5	0.42	0.19	0.55	0.14
	Stillwater	5	5	0.25	0.16	0.31	0.06

*Notes:**Prep: fillet**Non-detect values set to half method detection limit to calculate average and 2 SE.**ND = Non Detect*

Table 5-6. Congener-specific PCB summary statistics for perch.

Species	Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
White perch	Albany/Troy	1	1	0.24	0.24	0.24	-
Yellow perch	Thompson Island	3	1	0.50	0.50	0.50	-
	Thompson Island	5	1	0.37	0.37	0.37	-
	Northumberland/Fort Miller	1	1	0.47	0.47	0.47	-
	Northumberland/Fort Miller	3	1	0.60	0.60	0.60	-
	Northumberland/Fort Miller	5	1	0.39	0.39	0.39	-
	Stillwater	2	1	0.39	0.39	0.39	-
	Stillwater	3	1	1.35	1.35	1.35	-

Notes:

Prep = fillet

Table 5-7. Aroclor PCB summary statistics for pumpkinseed.

Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
Feeder Dam	1	20	0.06	0.02	0.10	0.01
Thompson Island Pool	1	5	3.47	0.97	7.96	2.53
Thompson Island Pool	2	5	2.37	0.88	4.35	1.43
Thompson Island Pool	3	5	4.65	3.31	6.76	1.27
Thompson Island Pool	4	5	2.22	1.89	2.60	0.25
Thompson Island Pool	5	10	3.97	2.54	5.00	0.49
Northumberland/Fort Miller	3	2	1.76	1.55	1.97	0.42
Northumberland/Fort Miller	5	23	1.31	0.32	3.76	0.36
Stillwater	1	5	1.98	0.90	3.27	1.09
Stillwater	2	5	2.23	0.71	4.11	1.10
Stillwater	3	5	1.40	0.83	2.49	0.57
Stillwater	4	5	0.98	0.57	1.25	0.28
Stillwater	5	10	0.92	0.67	1.28	0.13
Albany/Troy	1	20	0.59	0.37	1.13	0.08

Notes:

Prep: whole body

Non-detect values set to half method detection limit to calculate average and 2 SE.

ND = Non Detect

Table 5-8. Congener-specific PCB summary statistics for pumpkinseed.

Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
Albany/Troy	1	2	0.54	0.52	0.57	0.06
Feeder Dam	1	2	0.07	0.05	0.08	0.03
Northumberland/Fort Miller	3	1	1.61	1.61	1.61	-
Northumberland/Fort Miller	5	2	1.36	1.27	1.45	0.18
Stillwater	2	1	1.65	1.65	1.65	-
Stillwater	5	1	0.79	0.79	0.79	-

Notes:

Prep = whole body

Table 5-9. Aroclor PCB summary statistics for forage fish.

Species	Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
Forage Fish	Albany/Troy	1	10	0.52	0.28	0.79	0.11
	Feeder Dam	1	10	0.03	0.01	0.06	0.01
	Northumberland/Fort Miller	3	5	2.51	0.78	5.16	1.76
	Northumberland/Fort Miller	5	5	1.11	0.51	2.17	0.70
	Thompson Island Pool	1	2	2.30	0.56	4.04	3.48
	Thompson Island Pool	2	2	0.90	0.89	0.92	0.02
	Thompson Island Pool	3	2	2.64	1.22	4.07	2.02
	Thompson Island Pool	4	2	0.49	0.42	0.56	0.14
	Thompson Island Pool	5	2	1.29	1.14	1.45	0.30
	Stillwater	1	2	2.05	1.86	2.24	0.27
	Stillwater	2	2	0.90	0.89	0.90	0.01
	Stillwater	3	2	0.72	0.63	0.81	0.18
	Stillwater	4	2	0.79	0.31	1.28	0.68
	Stillwater	5	2	0.43	0.38	0.48	0.07

Notes:

Prep: whole body (composite)

Non-detect values set to half method detection limit to calculate average and 2 SE.

ND = Non Detect

Table 5-10. Congener-specific PCB summary statistics for forage fish.

Pool	Station Number	Count	Average mg/kg	Minimum mg/kg	Maximum mg/kg	2 SE mg/kg
Northumberland/Fort Miller	3	1	1.06	1.06	1.06	-
Stillwater	2	1	0.68	0.68	0.68	-
Stillwater	3	1	0.68	0.68	0.68	-
Stillwater	5	1	0.36	0.36	0.36	-

Notes:

Prep=whole body (composite)

Table 5-11. Percent lipid summary statistics for black bass.

Species	Pool	Station Number	Count	Average %	Minimum %	Maximum %	2 SE %
Largemouth bass	Feeder Dam	1	11	0.31	0.16	0.54	0.07
	Thompson Island Dam	3	1	1.09	1.09	1.09	-
	Thompson Island Dam	5	10	0.70	0.33	1.39	0.19
	Northumberland/Fort Miller	3	2	0.56	0.50	0.61	0.11
	Northumberland/Fort Miller	5	6	0.51	0.33	0.90	0.16
	Stillwater	1	1	0.72	0.72	0.72	-
	Stillwater	2	4	0.58	0.46	0.83	0.17
	Stillwater	3	10	0.17	0.10	0.42	0.06
	Stillwater	4	2	0.67	0.51	0.83	0.32
	Albany/Troy	1	1	1.57	1.57	1.57	-
Smallmouth bass	Feeder Dam	1	9	0.56	0.29	1.01	0.16
	Thompson Island Dam	1	5	0.89	0.47	1.32	0.32
	Thompson Island Dam	2	5	0.50	0.34	0.70	0.13
	Thompson Island Dam	3	4	1.02	0.75	1.15	0.18
	Thompson Island Dam	4	5	0.93	0.37	1.59	0.42
	Northumberland/Fort Miller	1	5	0.75	0.54	1.14	0.23
	Northumberland/Fort Miller	2	5	0.71	0.37	1.20	0.27
	Northumberland/Fort Miller	3	3	0.50	0.46	0.54	0.05
	Northumberland/Fort Miller	5	4	0.49	0.10	0.71	0.26
	Stillwater	1	4	0.70	0.62	0.78	0.08
	Stillwater	2	1	0.34	0.34	0.34	-
	Stillwater	4	2	0.89	0.87	0.91	0.04
	Stillwater	5	6	0.56	0.36	0.99	0.19
	Albany/Troy	1	19	0.81	0.16	1.74	0.19

*Notes:**Prep=fillet*

Table 5-12. Percent lipid summary statistics for ictalurids.

Species	Pool	Station Number	Count	Average %	Minimum %	Maximum %	2 SE %
Brown bullhead	Feeder Dam	1	12	1.06	0.44	2.29	0.26
	Thompson Island Pool	1	4	2.34	1.17	3.54	1.09
	Thompson Island Pool	2	5	1.86	0.99	2.41	0.50
	Thompson Island Pool	3	5	2.26	1.25	3.04	0.68
	Thompson Island Pool	4	5	1.92	1.47	2.49	0.36
	Thompson Island Pool	5	7	2.61	1.12	3.96	0.64
	Northumberland/Fort Miller	1	5	1.80	0.60	3.17	0.99
	Northumberland/Fort Miller	2	1	2.39	2.39	2.39	-
	Northumberland/Fort Miller	3	9	1.61	0.44	3.20	0.63
	Northumberland/Fort Miller	5	9	1.98	0.13	5.01	0.94
	Stillwater	1	4	2.03	0.50	2.98	1.07
	Stillwater	2	5	3.38	1.25	6.60	1.83
	Stillwater	3	9	1.70	0.86	2.70	0.42
	Stillwater	4	5	3.10	1.60	4.37	1.06
	Stillwater	5	5	2.12	0.80	3.95	1.35
	Albany/Troy	1	3	1.48	0.73	2.56	1.10
Channel catfish	Albany/Troy	1	4	9.18	6.11	15.50	4.28
White catfish	Albany/Troy	1	13	3.35	1.41	6.41	0.77
Yellow bullhead	Feeder Dam	1	8	0.78	0.33	1.65	0.33
	Thompson Island Pool	1	1	0.78	0.78	0.78	-
	Thompson Island Pool	5	3	1.06	0.57	1.35	0.50
	Northumberland/Fort Miller	5	1	1.86	1.86	1.86	-
	Stillwater	1	1	1.00	1.00	1.00	-
	Stillwater	3	1	0.29	0.29	0.29	-

Notes:

Prep=fillet

Table 5-13. Percent lipid summary statistics for perch.

Species	Pool	Station Number	Count	Average %	Minimum %	Maximum %	2 SE %
White perch	Albany/Troy	1	20	0.90	0.43	1.42	0.14
Yellow perch	Feeder Dam	1	20	0.61	0.18	0.95	0.11
	Thompson Island Pool	1	5	1.01	0.69	1.70	0.36
	Thompson Island Pool	2	5	0.54	0.26	0.75	0.17
	Thompson Island Pool	3	5	0.72	0.44	0.85	0.15
	Thompson Island Pool	4	5	0.76	0.38	1.22	0.32
	Thompson Island Pool	5	10	0.56	0.21	0.89	0.15
	Northumberland/Fort Miller	1	2	0.53	0.30	0.76	0.46
	Northumberland/Fort Miller	2	1	0.66	0.66	0.66	-
	Northumberland/Fort Miller	3	9	0.67	0.36	0.97	0.15
	Northumberland/Fort Miller	5	13	0.54	0.31	0.74	0.08
	Stillwater	1	5	0.38	0.23	0.59	0.12
	Stillwater	2	5	0.64	0.33	1.14	0.27
	Stillwater	3	10	0.88	0.18	2.02	0.36
	Stillwater	4	5	0.99	0.73	1.28	0.23
	Stillwater	5	5	0.70	0.52	0.90	0.13

Notes:

Prep=fillet

Table 5-14. Percent lipid summary statistics for pumpkinseed.

Pool	Station Number	Count	Average %	Minimum %	Maximum %	2 SE %
Feeder Dam	1	20	2.00	1.24	3.63	0.24
Thompson Island Pool	1	5	3.09	2.52	3.65	0.45
Thompson Island Pool	2	5	2.95	2.38	3.24	0.30
Thompson Island Pool	3	5	2.70	1.53	5.26	1.33
Thompson Island Pool	4	5	2.74	2.34	3.18	0.33
Thompson Island Pool	5	10	2.56	2.00	3.17	0.21
Northumberland/Fort Miller	3	2	3.13	2.46	3.80	1.34
Northumberland/Fort Miller	5	23	2.07	0.95	3.76	0.33
Stillwater	1	5	3.27	2.25	4.00	0.75
Stillwater	2	5	2.32	1.30	2.98	0.61
Stillwater	3	5	1.94	1.62	2.37	0.26
Stillwater	4	5	2.29	1.35	3.24	0.74
Stillwater	5	10	3.40	2.11	4.49	0.42
Albany/Troy	1	20	3.92	2.44	4.85	0.31

Notes:

Prep: whole body

Table 5-15. Percent lipid summary statistics for forage fish.

Species	Pool	Station Number	Count	Average %	Minimum %	Maximum %	2 SE %
Forage Fish	Feeder Dam	1	10	3.18	1.49	4.62	0.61
	Thompson Island Pool	1	2	3.50	1.83	5.17	3.34
	Thompson Island Pool	2	2	1.99	1.53	2.44	0.91
	Thompson Island Pool	3	2	1.77	1.76	1.78	0.01
	Thompson Island Pool	4	2	1.65	1.44	1.86	0.42
	Thompson Island Pool	5	2	2.23	1.26	3.20	1.94
	Northumberland/Fort Miller	3	5	4.74	2.49	7.19	2.09
	Northumberland/Fort Miller	5	5	2.99	2.09	3.97	0.16
	Stillwater	1	2	4.31	2.65	5.96	2.34
	Stillwater	2	2	0.90	0.89	0.90	0.01
	Stillwater	3	2	0.72	0.63	0.81	0.18
	Stillwater	4	2	1.95	1.08	2.82	1.23
	Stillwater	5	2	1.20	1.11	1.28	0.12
	Albany/Troy	1	10	0.52	0.28	0.79	0.11

Notes:

Prep: whole body (composite)

Table 5-16. Gender summary for black bass.

Species	Pool	Total Count	Count of Males	Count of Females	Count of Unknowns
Largemouth bass	Feeder Dam	11	6	5	0
	Thompson Island Pool	11	4	7	0
	Northumberland/Fort Miller	8	2	6	0
	Stillwater	17	12	5	0
	Albany/Troy	1	0	1	0
Smallmouth bass	Feeder Dam	9	6	3	0
	Thompson Island Pool	19	8	11	0
	Northumberland/Fort Miller	17	10	7	0
	Stillwater	13	10	3	0
	Albany/Troy	19	9	10	0

Notes:

Prep: fillet

Table 5-17. Gender summary for ictalurids.

Species	Pool	Total Count	Count of Males	Count of Females	Count of Unknowns
Brown bullhead	Feeder Dam	12	6	6	0
	Thompson Island Pool	26	7	17	2
	Northumberland/Fort Miller	24	12	10	2
	Stillwater	28	6	21	1
	Albany/Troy	0	0	3	0
Channel catfish	Albany/Troy	4	2	2	0
White catfish	Albany/Troy	13	6	7	0
	Feeder Dam	8	5	3	0
	Thompson Island Pool	4	3	1	0
Yellow bullhead	Northumberland/Fort Miller	1	0	1	0
	Stillwater	2	0	2	0

Notes:

Prep: fillet

Table 5-18. Gender summary for perch.

Species	Pool	Total Count	Count of Males	Count of Females	Count of Unknowns
White perch	Albany/Troy	20	10	7	3
Yellow perch	Feeder Dam	20	9	9	2
	Thompson Island Pool	30	16	7	7
	Northumberland/Fort Miller	25	12	9	4
	Stillwater	30	14	7	9

Notes:

Prep: fillet

Table 6-1. Special study summary PCB statistics.

Location	Sample Counts		Frequency Detected (%)	PCBs (ng/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
Thompson Island (PRW2)	6	0	83	14.96	22.56	28.00	2.21
Waterford High Flow	34	0	97	9.69	28.30	67.70	2.83

Notes:

Statistics based on detectable concentrations only.

Table 6-2. Special studies summary TSS statistics.

Location	Sample Counts		Frequency Detected (%)	TSS (mg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
Thompson Island (PRW2)	6	0	17	2.73	2.73	2.73	
Waterford High Flow	34	0	100	11.70	88.21	281.00	14.35

Notes:

Statistics based on detectable concentrations only.

Table 6-3. Special study summary POC/DOC statistics.

Location	Sample Counts		Frequency Detected (%)	Organic Carbon (mg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
Dissolved Total Organic Carbon							
Thompson Island (PRW2)	3	0	100	2.76	4.12	5.25	0.73
Waterford High Flow	34	0	100	2.56	3.00	3.46	0.05
Particulate Organic Carbon							
Thompson Island (PRW2)	3	0	33	0.41	0.41	0.41	--
Waterford High Flow	34	0	97	0.38	2.03	5.88	0.29

Notes:

Statistics based on detectable concentrations only.

Table 6-4. Baseline water additional TSS summary statistics.

Location	Sample Counts		Frequency Detected (%)	TSS (mg/L)			
	ENV	DUP		Minimum	Average	Maximum	Standard Error
Thompson Island Dam	9	0	44	<0.90	2.17	7.78	0.88
Schuylerville (Transect)	10	0	100	1.19	2.86	9.03	0.76

Notes:

Statistics based on detectable concentrations only.

Table 8-1. Summary of analytical data quality for 2007 water environmental samples¹.

Analysis Fraction	Number of Results Qualified ²									Total Number of Results ⁵	% Completeness ⁶	% Unusable Data ⁷	% Usable Data ⁸	Qualitative Data Quality	
	Unqualified Positive Results	U	<J ³	U*	JN	J	J ⁴	UJ	R						
PCB Congeners (Whole Water Extraction) (NE207_03)	4,585	28,848	43	2,280	0	6,052	5,716	567	0	0	42,375	91.3%	0.0%	100%	Very Good
Total Metals (200.8)	663	465	NA	482	0	380	376	6	0	0	1,996	69.6%	0.0%	100%	Above Average
Dissolved Metals (200.8)	577	467	NA	559	0	388	377	5	0	0	1,996	64.5%	0.0%	100%	Above Average
Total Mercury (245.1)	0	82	NA	4	0	4	4	0	0	0	90	95.3%	0.0%	100%	Excellent
Dissolved Mercury (245.1)	0	82	NA	6	0	2	2	0	0	0	90	93.2%	0.0%	100%	Very Good
Hardness (130.2)	48	0	NA	0	0	0	NA	0	0	0	48	100%	0.0%	100%	Excellent
Hardness (SM2340C)	42	0	NA	0	0	0	NA	0	0	0	42	100%	0.0%	100%	Excellent
Total Suspended Solids (160.2)	249	111	NA	0	0	18	NA	5	0	0	383	94.0%	0.0%	100%	Very Good
POC/DOC (NE128_03)	239	4	NA	171	0	142	NA	0	0	0	556	43.7%	0.0%	100%	Poor
ENTIRE WATER SAMPLE DATA SET	6,403	30,059	43	3,502	0	6,986	6,475	583	0	0	47,576	88.8%	0.0%	100%	Very Good

Notes:

1 - Summary is for water environmental samples and does not include results from Field Duplicates, Field Blanks, Lab Duplicates, Matrix Spikes or Blanks. Summary is based on Qualification of data from verification and validation.

2 - Results are the number of individual analytes in the analysis fraction. For example, there are 113 analytes in the PCB Congener analysis fraction.

3 - Results for Total PCBs where the sum of the positive PCB congener results was greater than 0 but below the sample-specific Total PCB MDL.

4 - Results qualified as estimates due to being below the reporting limit. For example, of the 6,052 NE207_03 PCB congener (whole water extraction) results that were qualified J, 5,716 results were qualified J due to being below the reporting limit.

5 - Total Number of Results is the summation of all qualified and unqualified results.

6 - The % Completeness is the sum of results that were valid as reported [Unqualified Positive Results + UJ/Total Number of Results - <J³ - J⁴].

7 - % Unusable Data is the sum of the results qualified R + UR/Total Number of Results.

8 - % Usable Data is the sum of the Unqualified Positive Results + U [+<J for total PCBs] + U* + J + JN + UJ/Total Number of Results.

Table 8-2. Summary of analytical data quality for 2007 fish tissue environmental samples¹.

Analysis Fraction	Number of Results Qualified ²									Total Number of Results ⁵	% Completeness ⁶	% Unusable Data ⁷	% Usable Data ⁸	Qualitative Data Quality	
	Unqualified Positive Results	U	<J ³	U*	JN	J	J ⁴	UJ	R						
PCBs as Aroclors (NE148_04)	1,380	2,717	NA	0	0	203	134	100	0	0	4,400	96.0%	0.0%	100%	Excellent
PCB Congeners (NE013_07)	2,486	1,099	3	114	0	1,938	1,654	72	0	0	5,712	88.3%	0.0%	100%	Very Good
ENTIRE FISH TISSUE DATA SET	3,866	3,816	3	114	0	2,141	1,788	172	0	0	10,112	92.3%	0.0%	100%	Very Good

Notes:

1 - Summary is for fish tissue environmental samples and does not include results from Lab Duplicates, Matrix Spikes or Blanks. Summary is based on Qualification of data from verification and validation.

2 - Results are the number of individual analytes in the analysis fraction. For example, there are 8 analytes in the Total PCBs as Aroclors analysis fraction.

3 - Results for Total PCBs where the sum of the positive PCB congener results was greater than 0 but below the sample-specific Total PCB MDL.

4 - Results qualified as estimates due to being below the reporting limit. For example, of the 203 NE148_04 results that were qualified J, 134 results were qualified J due to being below the reporting limit.

5 - Total Number of Results is the summation of all qualified and unqualified results.

6 - The % Completeness is the sum of results that were valid as reported [Unqualified Positive Results + U]/Total Number of Results - <J³ - J⁴.

7 - % Unusable Data is the sum of the results qualified R + UR/Total Number of Results.

8 - % Usable Data is the sum of the Unqualified Positive Results + U [+<J for total PCBs] + U* + J + JN + UJ/Total Number of Results.

Table 8-3. Summary of water field duplicate results for the modified Green Bay Method in 2007.

Method	Analyte	Total No. Field Duplicate Pairs	Total No. Field Duplicate Pairs with NDs for Both Samples	Total No. Field Duplicate Pairs with Positives in Either Sample					Overall % Meet Criteria
				Total No.	No. Meet Criteria	No. Do Not Meet Criteria	% Meet Criteria	% Do Not Meet Criteria	
NE207_03	Total PCB	45	5	40	40	0	100	0	100
NE207_03	Peak 2	45	11	34	31	3	91	9	93
NE207_03	Peak 3	45	45	0	0	0	NA	NA	100
NE207_03	Peak 4	45	45	0	0	0	NA	NA	100
NE207_03	Peak 5	45	0	45	42	3	93	7	93
NE207_03	Peak 6	45	27	18	18	0	100	0	100
NE207_03	Peak 7	45	21	24	23	1	96	4	98
NE207_03	Peak 8	45	33	12	12	0	100	0	100
NE207_03	Peak 9	45	45	0	0	0	NA	NA	100
NE207_03	Peak 10	45	6	39	32	7	82	18	84
NE207_03	Peak 11	45	45	0	0	0	NA	NA	100
NE207_03	Peak 12	45	45	0	0	0	NA	NA	100
NE207_03	Peak 13	45	45	0	0	0	NA	NA	100
NE207_03	Peak 14	45	6	39	39	0	100	0	100
NE207_03	Peak 15	45	20	25	24	1	96	4	98
NE207_03	Peak 16	45	6	39	32	7	82	18	84
NE207_03	Peak 17	45	4	41	41	0	100	0	100
NE207_03	Peak 19	45	45	0	0	0	NA	NA	100
NE207_03	Peak 20	45	38	7	4	3	57	43	93
NE207_03	Peak 21	45	9	36	33	3	92	8	93
NE207_03	Peak 22	45	20	25	21	4	84	16	91
NE207_03	Peak 23	45	13	32	32	0	100	0	100
NE207_03	Peak 24	45	5	40	40	0	100	0	100
NE207_03	Peak 25	45	10	35	35	0	100	0	100
NE207_03	Peak 26	45	15	30	30	0	100	0	100

Method	Analyte	Total No. Field Duplicate Pairs	Total No. Field Duplicate Pairs with NDs for Both Samples	Total No. Field Duplicate Pairs with Positives in Either Sample					Overall % Meet Criteria
				Total No.	No. Meet Criteria	No. Do Not Meet Criteria	% Meet Criteria	% Do Not Meet Criteria	
NE207_03	Peak 27	45	26	19	17	2	89	11	96
NE207_03	Peak 28	45	45	0	0	0	NA	NA	100
NE207_03	Peak 29	45	36	9	5	4	56	44	91
NE207_03	Peak 30	45	45	0	0	0	NA	NA	100
NE207_03	Peak 31	45	4	41	41	0	100	0	100
NE207_03	Peak 32	45	4	41	41	0	100	0	100
NE207_03	Peak 33	45	11	34	34	0	100	0	100
NE207_03	Peak 34	45	17	28	28	0	100	0	100
NE207_03	Peak 35	45	45	0	0	0	NA	NA	100
NE207_03	Peak 36	45	45	0	0	0	NA	NA	100
NE207_03	Peak 37	45	9	36	36	0	100	0	100
NE207_03	Peak 38	45	7	38	38	0	100	0	100
NE207_03	Peak 39	45	9	36	36	0	100	0	100
NE207_03	Peak 41	45	45	0	0	0	NA	NA	100
NE207_03	Peak 42	45	23	22	21	1	95	5	98
NE207_03	Peak 43	45	45	0	0	0	NA	NA	100
NE207_03	Peak 44	45	20	25	23	2	92	8	96
NE207_03	Peak 45	45	43	2	2	0	100	0	100
NE207_03	Peak 46	45	26	19	19	0	100	0	100
NE207_03	Peak 47	45	38	7	7	0	100	0	100
NE207_03	Peak 48	45	26	19	19	0	100	0	100
NE207_03	Peak 49	45	24	21	20	1	95	5	98
NE207_03	Peak 50	45	19	26	26	0	100	0	100
NE207_03	Peak 51	45	15	30	30	0	100	0	100
NE207_03	Peak 52	45	43	2	2	0	100	0	100
NE207_03	Peak 53	45	10	35	35	0	100	0	100

Method	Analyte	Total No. Field Duplicate Pairs	Total No. Field Duplicate Pairs with NDs for Both Samples	Total No. Field Duplicate Pairs with Positives in Either Sample					Overall % Meet Criteria
				Total No.	No. Meet Criteria	No. Do Not Meet Criteria	% Meet Criteria	% Do Not Meet Criteria	
NE207_03	Peak 54	45	18	27	26	1	96	4	98
NE207_03	Peak 55	45	31	14	9	5	64	36	89
NE207_03	Peak 56	45	26	19	19	0	100	0	100
NE207_03	Peak 57	45	20	25	24	1	96	4	98
NE207_03	Peak 58	45	5	40	40	0	100	0	100
NE207_03	Peak 59	45	8	37	37	0	100	0	100
NE207_03	Peak 60	45	30	15	15	0	100	0	100
NE207_03	Peak 61	45	4	41	41	0	100	0	100
NE207_03	Peak 62	45	45	0	0	0	NA	NA	100
NE207_03	Peak 63	45	36	9	7	2	78	22	96
NE207_03	Peak 64	45	36	9	9	0	100	0	100
NE207_03	Peak 65	45	29	16	16	0	100	0	100
NE207_03	Peak 66	45	28	17	16	1	94	6	98
NE207_03	Peak 67	45	21	24	21	3	88	13	93
NE207_03	Peak 68	45	43	2	2	0	100	0	100
NE207_03	Peak 69	45	38	7	7	0	100	0	100
NE207_03	Peak 70	45	45	0	0	0	NA	NA	100
NE207_03	Peak 71	45	45	0	0	0	NA	NA	100
NE207_03	Peak 72	45	45	0	0	0	NA	NA	100
NE207_03	Peak 73	45	44	1	1	0	100	0	100
NE207_03	Peak 74	45	37	8	8	0	100	0	100
NE207_03	Peak 75	45	45	0	0	0	NA	NA	100
NE207_03	Peak 76	45	45	0	0	0	NA	NA	100
NE207_03	Peak 77	45	45	0	0	0	NA	NA	100
NE207_03	Peak 78	45	45	0	0	0	NA	NA	100
NE207_03	Peak 79	45	45	0	0	0	NA	NA	100

Method	Analyte	Total No. Field Duplicate Pairs	Total No. Field Duplicate Pairs with NDs for Both Samples	Total No. Field Duplicate Pairs with Positives in Either Sample					Overall % Meet Criteria
				Total No.	No. Meet Criteria	No. Do Not Meet Criteria	% Meet Criteria	% Do Not Meet Criteria	
NE207_03	Peak 80	45	42	3	3	0	100	0	100
NE207_03	Peak 82	45	38	7	7	0	100	0	100
NE207_03	Peak 83	45	45	0	0	0	NA	NA	100
NE207_03	Peak 84	45	44	1	0	1	0	100	98
NE207_03	Peak 85	45	45	0	0	0	NA	NA	100
NE207_03	Peak 87	45	45	0	0	0	NA	NA	100
NE207_03	Peak 88	45	45	0	0	0	NA	NA	100
NE207_03	Peak 89	45	45	0	0	0	NA	NA	100
NE207_03	Peak 90	45	45	0	0	0	NA	NA	100
NE207_03	Peak 91	45	45	0	0	0	NA	NA	100
NE207_03	Peak 92	45	45	0	0	0	NA	NA	100
NE207_03	Peak 93	45	45	0	0	0	NA	NA	100
NE207_03	Peak 94	45	45	0	0	0	NA	NA	100
NE207_03	Peak 95	45	45	0	0	0	NA	NA	100
NE207_03	Peak 96	45	45	0	0	0	NA	NA	100
NE207_03	Peak 98	45	45	0	0	0	NA	NA	100
NE207_03	Peak 99	45	45	0	0	0	NA	NA	100
NE207_03	Peak 100	45	45	0	0	0	NA	NA	100
NE207_03	Peak 101	45	45	0	0	0	NA	NA	100
NE207_03	Peak 102	45	45	0	0	0	NA	NA	100
NE207_03	Peak 103	45	45	0	0	0	NA	NA	100
NE207_03	Peak 104	45	45	0	0	0	NA	NA	100
NE207_03	Peak 105	45	45	0	0	0	NA	NA	100
NE207_03	Peak 106	45	45	0	0	0	NA	NA	100
NE207_03	Peak 107	45	45	0	0	0	NA	NA	100
NE207_03	Peak 108	45	45	0	0	0	NA	NA	100

Method	Analyte	Total No. Field Duplicate Pairs	Total No. Field Duplicate Pairs with NDs for Both Samples	Total No. Field Duplicate Pairs with Positives in Either Sample					Overall % Meet Criteria
				Total No.	No. Meet Criteria	No. Do Not Meet Criteria	% Meet Criteria	% Do Not Meet Criteria	
NE207_03	Peak 109	45	45	0	0	0	NA	NA	100
NE207_03	Peak 110	45	45	0	0	0	NA	NA	100
NE207_03	Peak 111	45	45	0	0	0	NA	NA	100
NE207_03	Peak 112	45	45	0	0	0	NA	NA	100
NE207_03	Peak 113	45	45	0	0	0	NA	NA	100
NE207_03	Peak 114	45	45	0	0	0	NA	NA	100
NE207_03	Peak 115	45	45	0	0	0	NA	NA	100
NE207_03	Peak 116	45	45	0	0	0	NA	NA	100
NE207_03	Peak 117	45	45	0	0	0	NA	NA	100
NE207_03	Peak 118	45	45	0	0	0	NA	NA	100
NE207_03	All Results ¹	5085	3712	1373	1317	56	96	4	99

Notes:

1 - All Results = Total number Field Duplicate Pairs multiplied by the number of analytes determined by the method.

Table 8-4. Summary of water field duplicate results for all methods other than the modified Green Bay Method in 2007.

Method	Analyte	Total No. Field Duplicate Pairs	Total No. Field Duplicate Pairs with NDs for Both Samples	Total No. Field Duplicate Pairs with Positives in Either Sample					Overall % Meet Criteria
				Total No.	No. Meet Criteria	No. Do Not Meet Criteria	% Meet Criteria	% Do Not Meet Criteria	
EPA 200.8	TAL - Aluminum	15	0	15	14	1	93	7	93
EPA 200.8	TAL - Iron	15	0	15	14	1	93	7	93
EPA 200.8	TAL - Lead	15	7	8	8	0	100	0	100
EPA 200.8	TAL - Magnesium	15	0	15	14	1	93	7	93
EPA 200.8	TAL - Manganese	15	0	15	14	1	93	7	93
EPA 200.8	TAL - Nickel	15	3	12	12	0	100	0	100
EPA 200.8	TAL - Potassium	15	1	14	13	1	93	7	93
EPA 200.8	TAL - Silver	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Sodium	15	0	15	14	1	93	7	93
EPA 200.8	TAL - Thallium	15	7	8	8	0	100	0	100
EPA 200.8	TAL - Antimony	15	11	4	4	0	100	0	100
EPA 200.8	TAL - Arsenic	15	9	6	6	0	100	0	100
EPA 200.8	TAL - Barium	15	0	15	15	0	100	0	100
EPA 200.8	TAL - Beryllium	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Cadmium	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Chromium	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Cobalt	15	2	13	13	0	100	0	100
EPA 200.8	TAL - Copper	15	10	5	4	1	80	20	93
EPA 200.8	TAL - Vanadium	15	9	6	6	0	100	0	100
EPA 200.8	TAL - Zinc	15	13	2	0	2	0	100	87
EPA 200.8	TAL - Calcium	15	0	15	14	1	93	7	93
EPA 200.8	TAL - Selenium	15	13	2	2	0	100	0	100
EPA 200.8	All Results ¹	330	145	185	175	10	95	5	97
EPA 200.8	TAL - Aluminum (DISS)	15	4	11	11	0	100	0	100
EPA 200.8	TAL - Iron (DISS)	15	1	14	12	2	86	14	87
EPA 200.8	TAL - Lead (DISS)	15	10	5	5	0	100	0	100
EPA 200.8	TAL - Magnesium (DISS)	15	0	15	15	0	100	0	100
EPA 200.8	TAL - Manganese (DISS)	15	0	15	14	1	93	7	93
EPA 200.8	TAL - Nickel (DISS)	15	8	7	7	0	100	0	100

Method	Analyte	Total No. Field Duplicate Pairs	Total No. Field Duplicate Pairs with NDs for Both Samples	Total No. Field Duplicate Pairs with Positives in Either Sample					Overall % Meet Criteria
				Total No.	No. Meet Criteria	No. Do Not Meet Criteria	% Meet Criteria	% Do Not Meet Criteria	
EPA 200.8	TAL - Potassium (DISS)	15	1	14	14	0	100	0	100
EPA 200.8	TAL - Silver (DISS)	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Sodium (DISS)	15	0	15	15	0	100	0	100
EPA 200.8	TAL - Thallium (DISS)	15	11	4	4	0	100	0	100
EPA 200.8	TAL - Antimony (DISS)	15	7	8	8	0	100	0	100
EPA 200.8	TAL - Arsenic (DISS)	15	10	5	5	0	100	0	100
EPA 200.8	TAL - Barium (DISS)	15	0	15	15	0	100	0	100
EPA 200.8	TAL - Beryllium (DISS)	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Cadmium (DISS)	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Chromium (DISS)	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Cobalt (DISS)	15	2	13	5	8	38	62	47
EPA 200.8	TAL - Copper (DISS)	15	12	3	3	0	100	0	100
EPA 200.8	TAL - Vanadium (DISS)	15	10	5	5	0	100	0	100
EPA 200.8	TAL - Zinc (DISS)	15	15	0	0	0	NA	NA	100
EPA 200.8	TAL - Calcium (DISS)	15	0	15	15	0	100	0	100
EPA 200.8	TAL - Selenium (DISS)	15	13	2	2	0	100	0	100
EPA 200.8	All Results ¹	330	164	166	155	11	93	7	97
EPA 245.1	TAL - Mercury	15	15	0	0	0	NA	NA	100
EPA 245.1	TAL - Mercury (DISS)	15	14	1	1	0	100	0	100
EPA 130.2	Hardness	8	0	8	8	0	100	0	100
SM 2340C	Hardness	7	0	7	7	0	100	0	100
NE128_03	Particulate Organic Carbon	41	24	17	12	5	71	29	88
NE128_03	Dissolved Organic Carbon	41	1	40	34	6	85	15	85
EPA 160.2	Total Suspended Solids	46	11	35	25	10	71	29	78

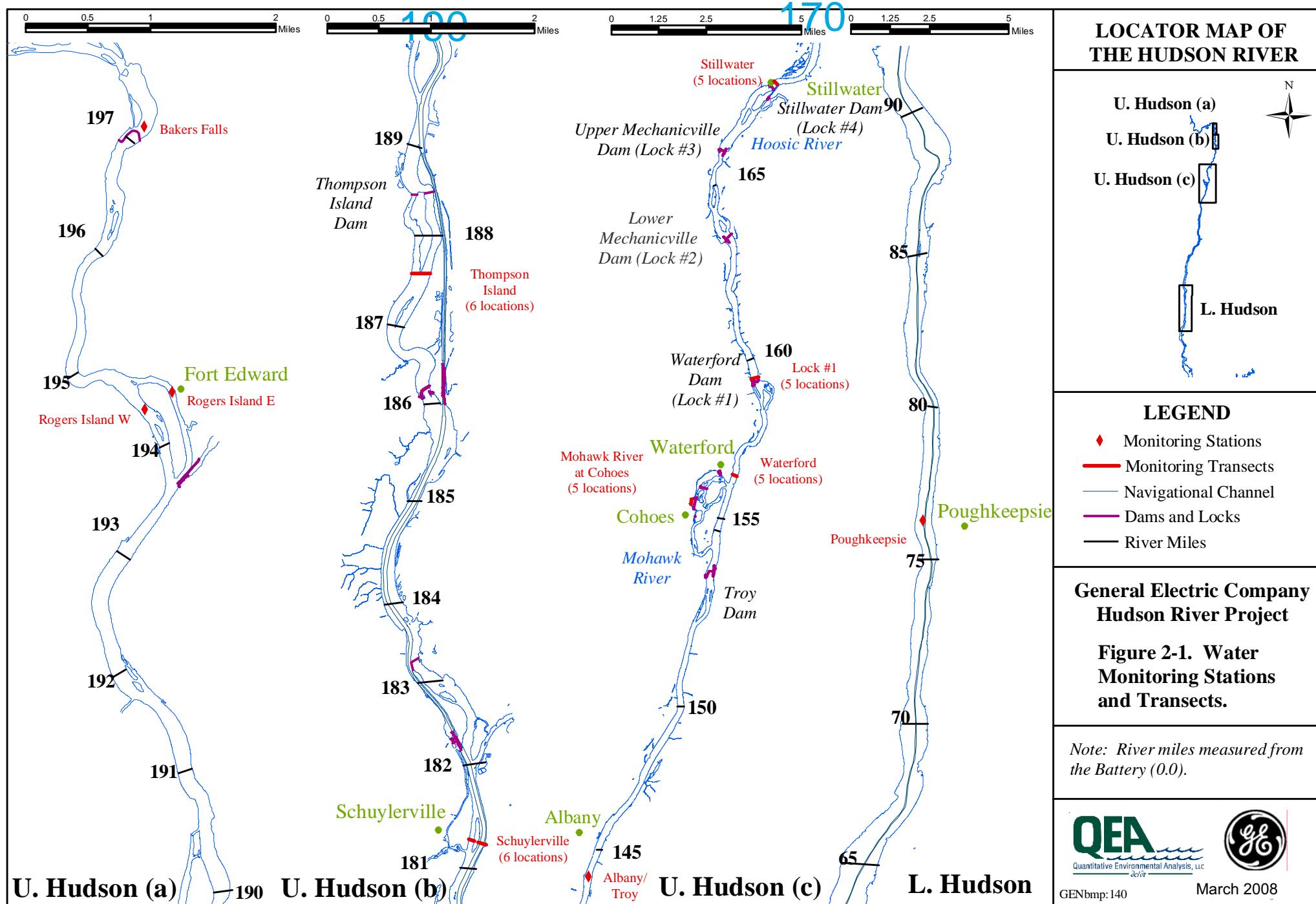
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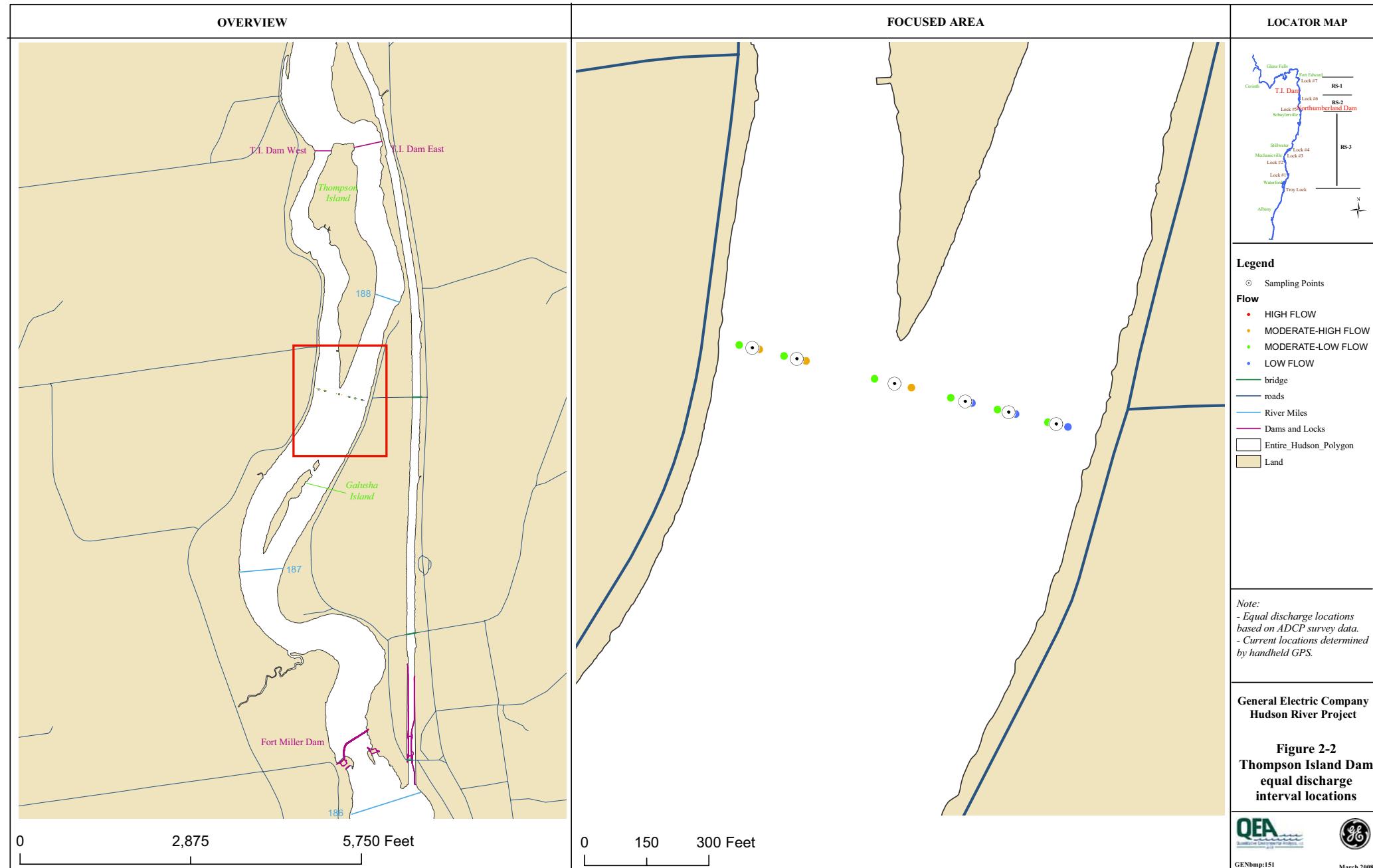
1 - All Results = Total number Field Duplicate Pairs multiplied by the number of analytes determined by the method.

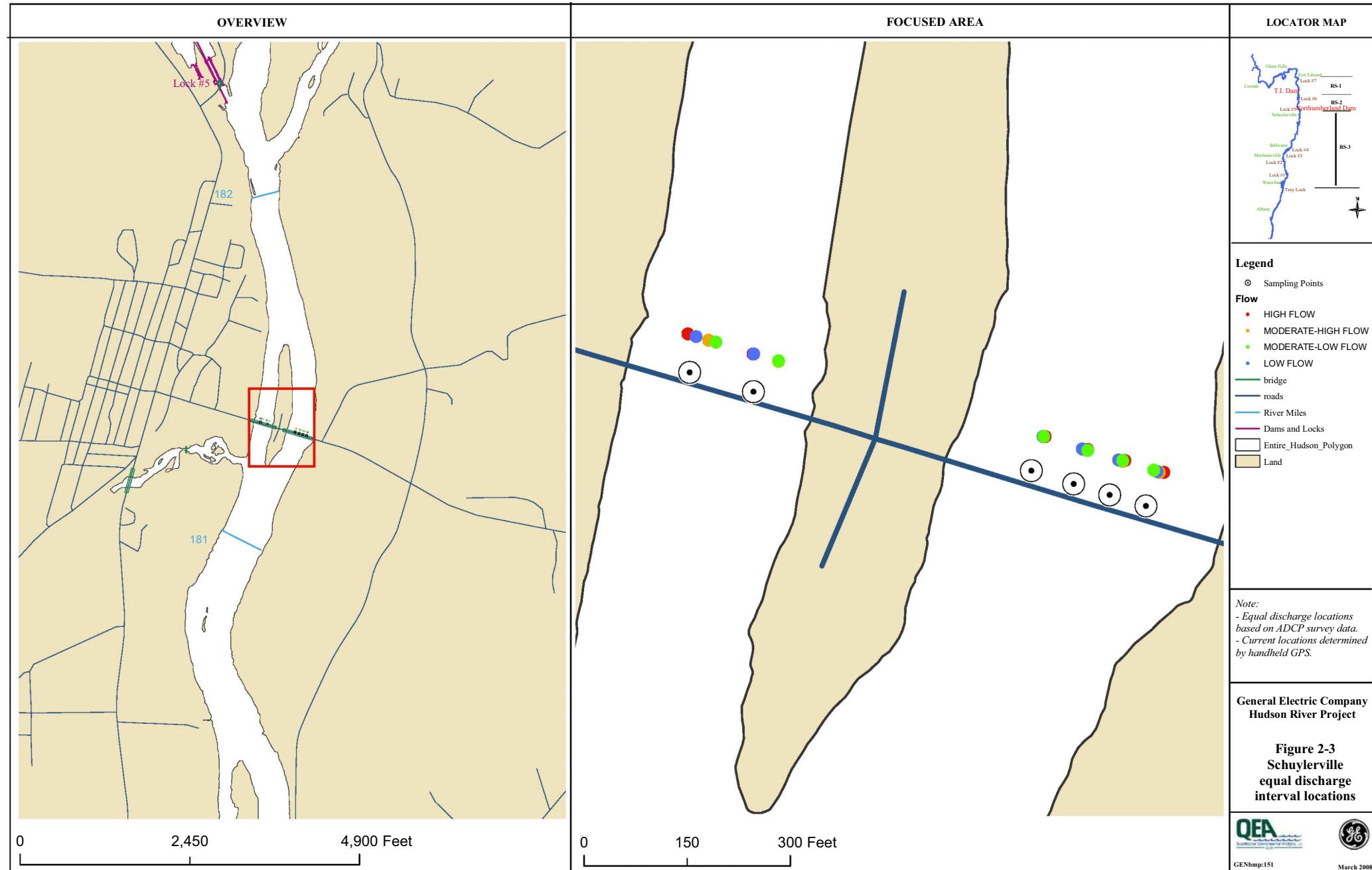
Table 8-5. Summary statistics of 2007 equipment blanks for water sampling program.

Analyte	Method	No. Field Blanks	Field Blanks with Results > MDL	Minimum Concentration	Maximum Concentration	Average Concentration	Median Concentration	Concentration Units	% Contaminated
TAL - Aluminum	EPA 200.8	15	3	3.0	3.8	3.5	3.6	ug/L	20%
TAL - Aluminum (DISS)	EPA 200.8	15	3	5.4	9.0	6.7	5.8	ug/L	20%
TAL - Antimony	EPA 200.8	15	2	0.10	0.14	0.12	0.12	ug/L	13%
TAL - Antimony (DISS)	EPA 200.8	15	2	0.089	0.11	0.10	0.10	ug/L	13%
TAL - Arsenic	EPA 200.8	15	3	0.12	0.42	0.23	0.14	ug/L	20%
TAL - Arsenic (DISS)	EPA 200.8	15	3	0.14	0.41	0.23	0.15	ug/L	20%
TAL - Barium	EPA 200.8	15	6	0.099	0.83	0.33	0.23	ug/L	40%
TAL - Barium (DISS)	EPA 200.8	15	2	0.11	0.66	0.39	0.39	ug/L	13%
TAL - Beryllium	EPA 200.8	15	1	0.43	0.43	0.43	0.43	ug/L	7%
TAL - Beryllium (DISS)	EPA 200.8	15	1	0.083	0.083	0.083	0.083	ug/L	7%
TAL - Calcium	EPA 200.8	15	12	8.1	41.8	20.5	15.6	ug/L	80%
TAL - Calcium (DISS)	EPA 200.8	15	10	8.6	84.7	36.8	24.9	ug/L	67%
TAL - Chromium	EPA 200.8	15	15	0.19	3.5	1.2	0.95	ug/L	100%
TAL - Chromium (DISS)	EPA 200.8	15	15	0.24	3.2	1.2	0.90	ug/L	100%
TAL - Cobalt	EPA 200.8	15	2	0.046	0.094	0.070	0.070	ug/L	13%
TAL - Cobalt (DISS)	EPA 200.8	15	11	0.063	0.48	0.20	0.16	ug/L	73%
TAL - Copper	EPA 200.8	15	15	0.21	0.98	0.42	0.36	ug/L	100%
TAL - Copper (DISS)	EPA 200.8	15	15	0.2	1.5	0.46	0.38	ug/L	100%
TAL - Iron (DISS)	EPA 200.8	15	2	11.5	26.5	19.0	19.0	ug/L	13%
TAL - Lead	EPA 200.8	15	6	0.036	0.28	0.150	0.15	ug/L	40%
TAL - Lead (DISS)	EPA 200.8	15	9	0.033	0.18	0.088	0.057	ug/L	60%
TAL - Magnesium	EPA 200.8	15	2	5.9	11.8	8.9	8.9	ug/L	13%
TAL - Magnesium (DISS)	EPA 200.8	15	3	4.3	25.6	12.5	7.5	ug/L	20%
TAL - Manganese	EPA 200.8	15	3	0.058	2.8	0.97	0.064	ug/L	20%
TAL - Manganese (DISS)	EPA 200.8	15	10	0.049	0.87	0.34	0.22	ug/L	67%
TAL - Nickel	EPA 200.8	15	5	0.062	0.37	0.17	0.13	ug/L	33%
TAL - Nickel (DISS)	EPA 200.8	15	7	0.071	0.40	0.17	0.15	ug/L	47%
TAL - Potassium	EPA 200.8	15	3	8	399	139	8.8	ug/L	20%
TAL - Potassium (DISS)	EPA 200.8	15	6	6.9	390	72.6	7.8	ug/L	40%
TAL - Selenium	EPA 200.8	15	7	0.18	1.2	0.62	0.41	ug/L	47%
TAL - Selenium (DISS)	EPA 200.8	15	6	0.21	0.97	0.50	0.41	ug/L	40%
TAL - Silver	EPA 200.8	15	1	0.054	0.054	0.054	0.054	ug/L	7%
TAL - Sodium	EPA 200.8	15	7	12	73.5	26.7	21.4	ug/L	47%
TAL - Sodium (DISS)	EPA 200.8	15	10	12.3	62.3	25.6	23.1	ug/L	67%
TAL - Thallium	EPA 200.8	15	3	0.037	0.21	0.14	0.18	ug/L	20%
TAL - Thallium (DISS)	EPA 200.8	15	3	0.042	0.26	0.12	0.065	ug/L	20%
TAL - Vanadium	EPA 200.8	15	9	0.13	2.2	0.50	0.30	ug/L	60%
TAL - Vanadium (DISS)	EPA 200.8	15	8	0.15	1.3	0.43	0.33	ug/L	53%
TAL - Zinc	EPA 200.8	15	15	1.4	8.0	3.6	3.3	ug/L	100%
TAL - Zinc (DISS)	EPA 200.8	15	15	1.3	11.3	3.6	3.3	ug/L	100%
TAL - Mercury	EPA 245.1	15	1	0.062	0.062	0.062	0.062	ug/L	7%
TAL - Mercury (DISS)	EPA 245.1	15	1	0.064	0.064	0.064	0.064	ug/L	7%
DOC	NE128_03	43	8	0.545	5.27	1.31	0.766	mg/L	19%
POC	NE128_03	43	32	0.067	0.535	0.137	0.102	mg/L	74%

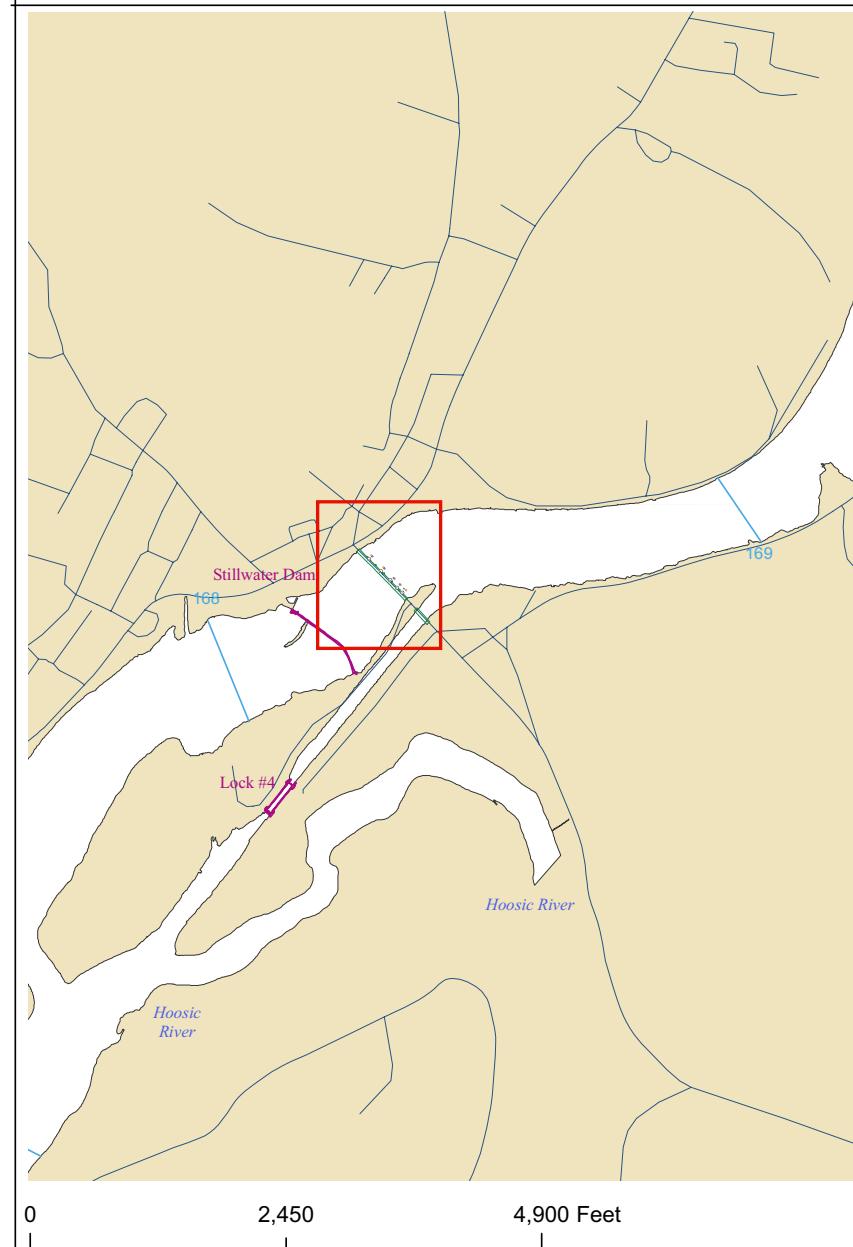
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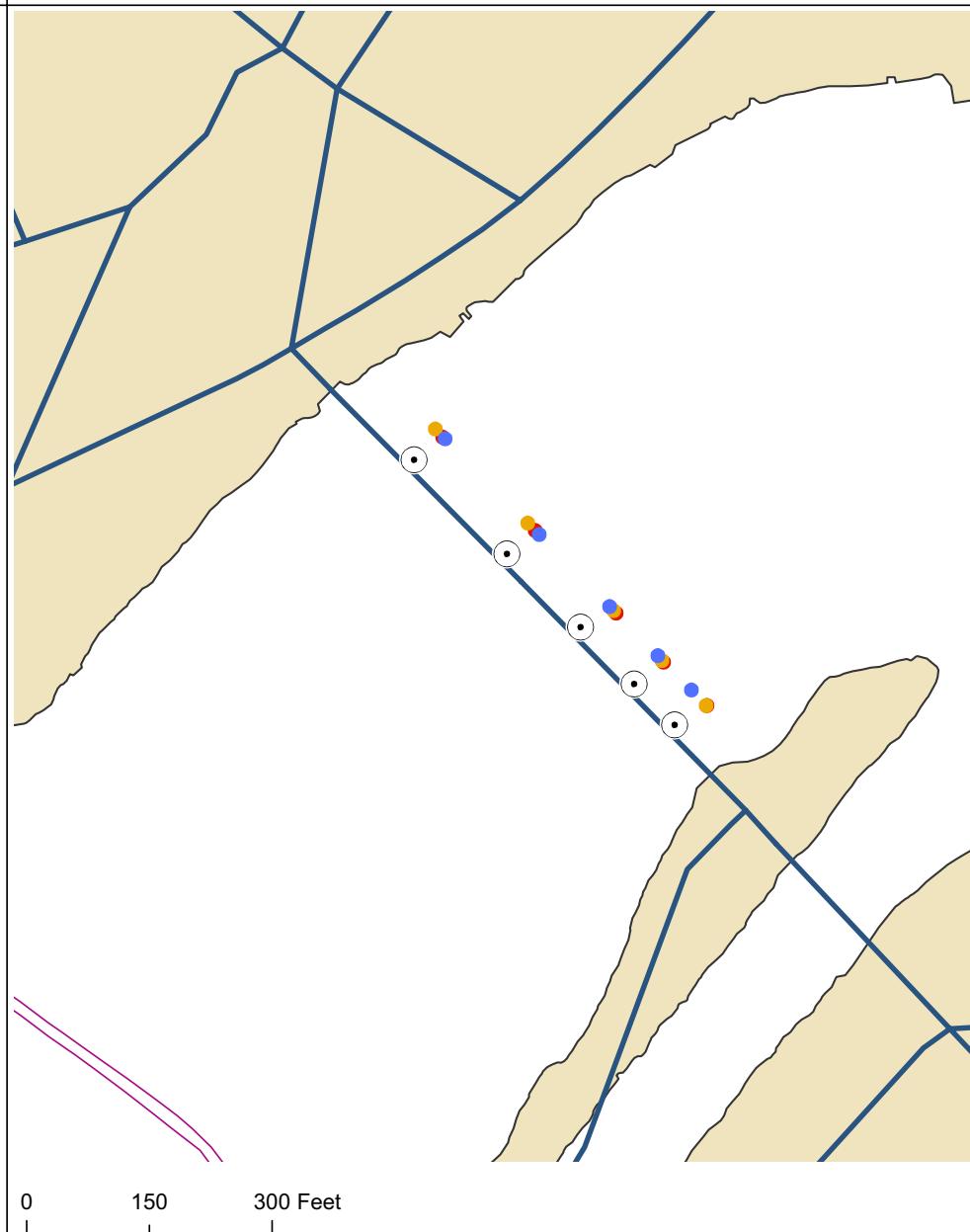




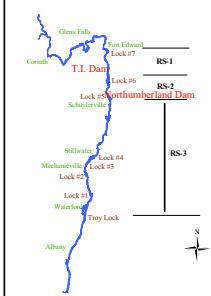
OVERVIEW



FOCUSED AREA



LOCATOR MAP



Legend

- Sampling Points
- Flow
 - HIGH FLOW
 - MODERATE-HIGH FLOW
 - MODERATE-LOW FLOW
 - LOW FLOW
- bridge
- roads
- River Miles
- Dams and Locks
- Entire_Hudson_Polygon
- Land

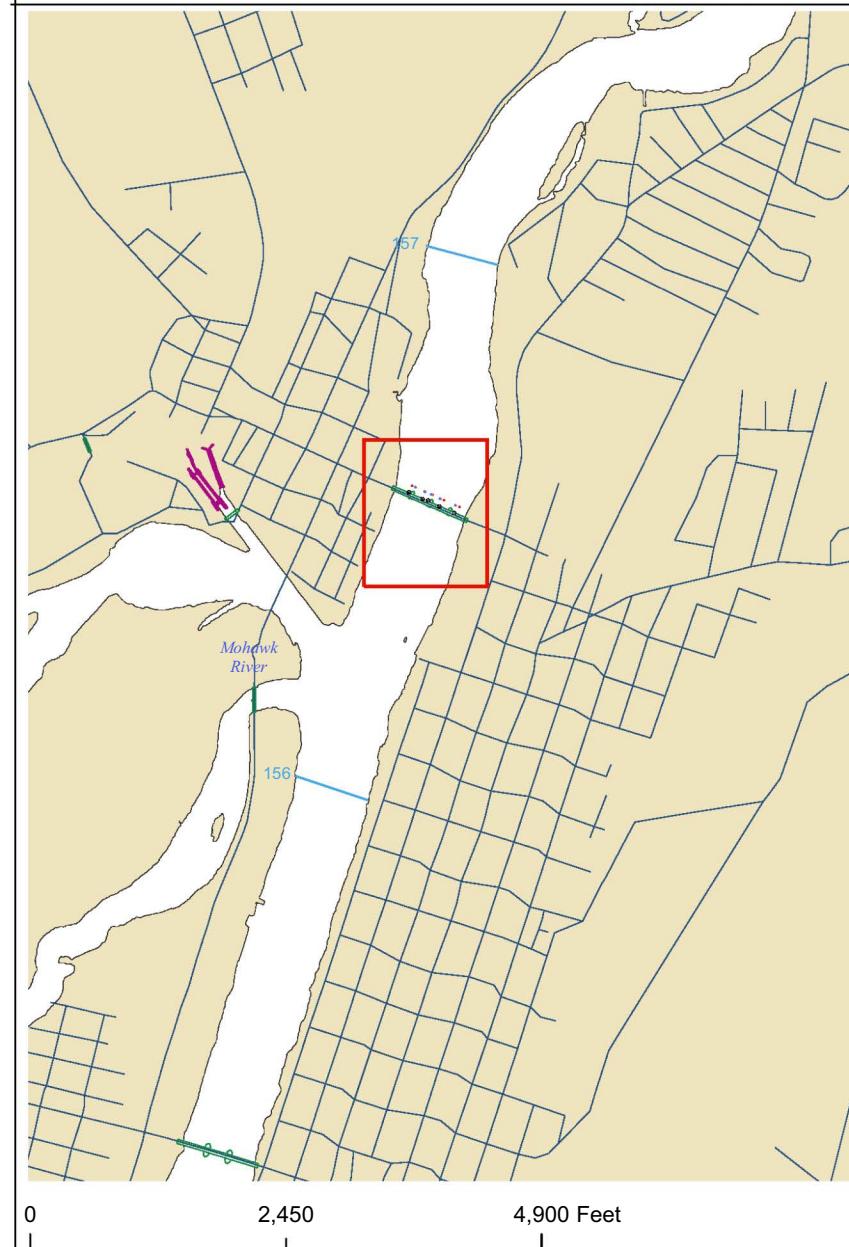
Note:
- Equal discharge locations based on ADCP survey data.
- Current locations determined by handheld GPS.

General Electric Company
Hudson River Project

Figure 2-4
Stillwater
equal discharge
interval locations



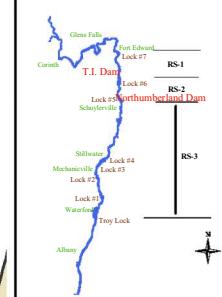
OVERVIEW



FOCUSED AREA



LOCATOR MAP



Legend

- Sampling Points
- Flow**
- HIGH FLOW
- MODERATE-HIGH FLOW
- MODERATE-LOW FLOW
- LOW FLOW
- bridge
- roads
- River Miles
- Dams and Locks
- Entire_Hudson_Polygon
- Land

Note:

- Equal discharge locations based on ADCP survey data.
- Current locations determined by handheld GPS.

General Electric Company
Hudson River Project

Figure 2-5
Waterford
equal discharge
interval locations

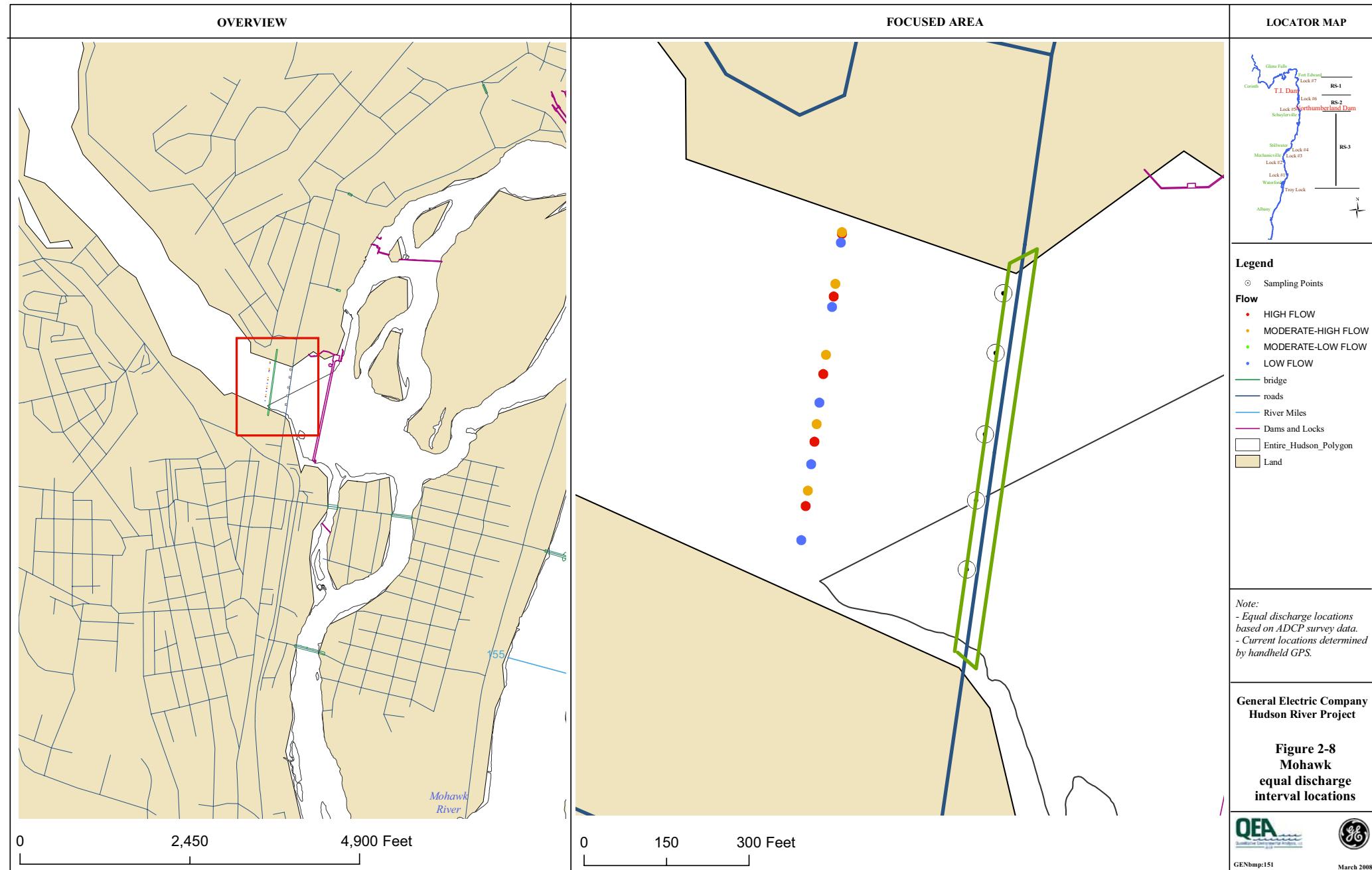


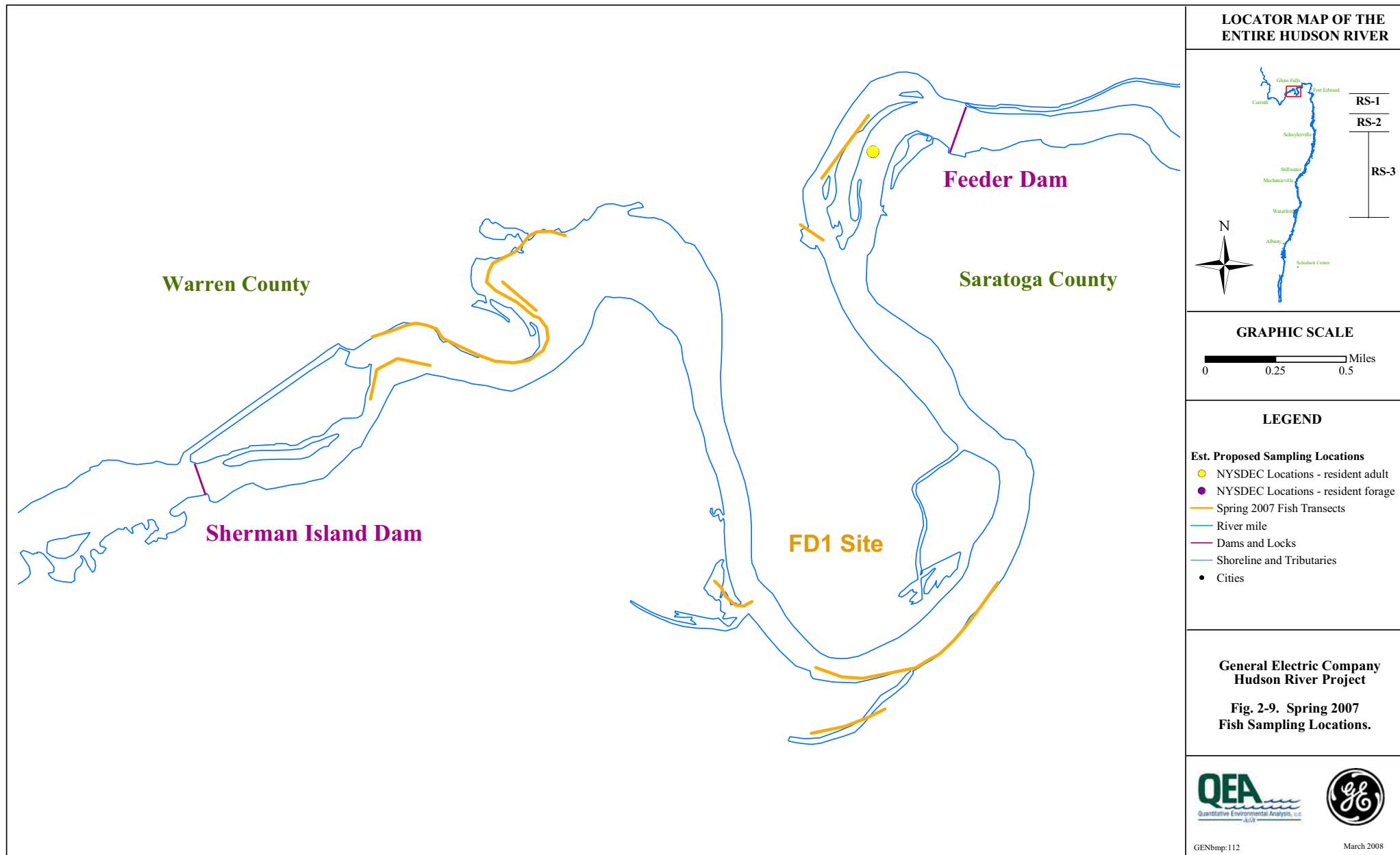


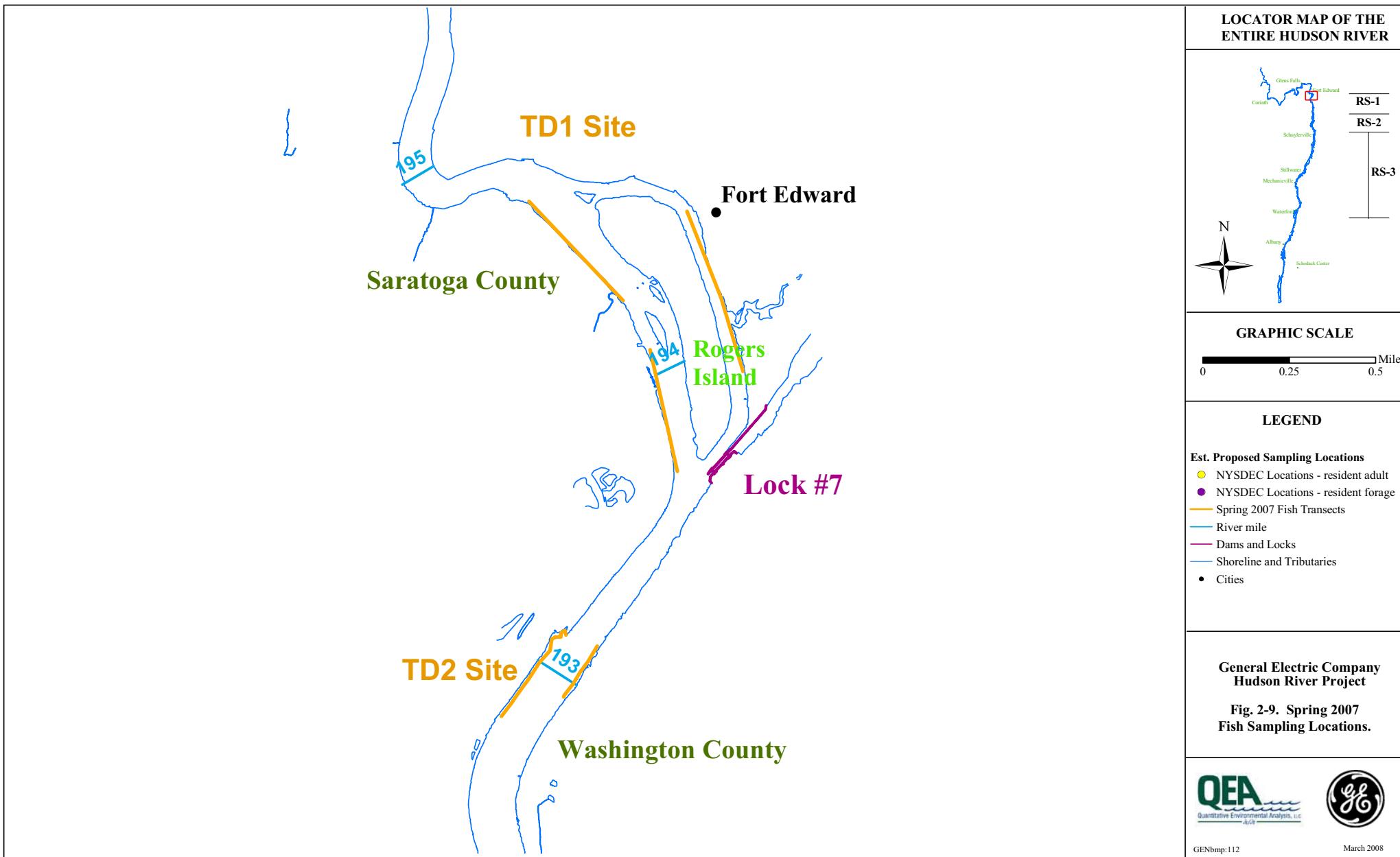
Figure 2-6. Variable Speed Bridge and Boat Cranes for the BMP Water Sampling Program.

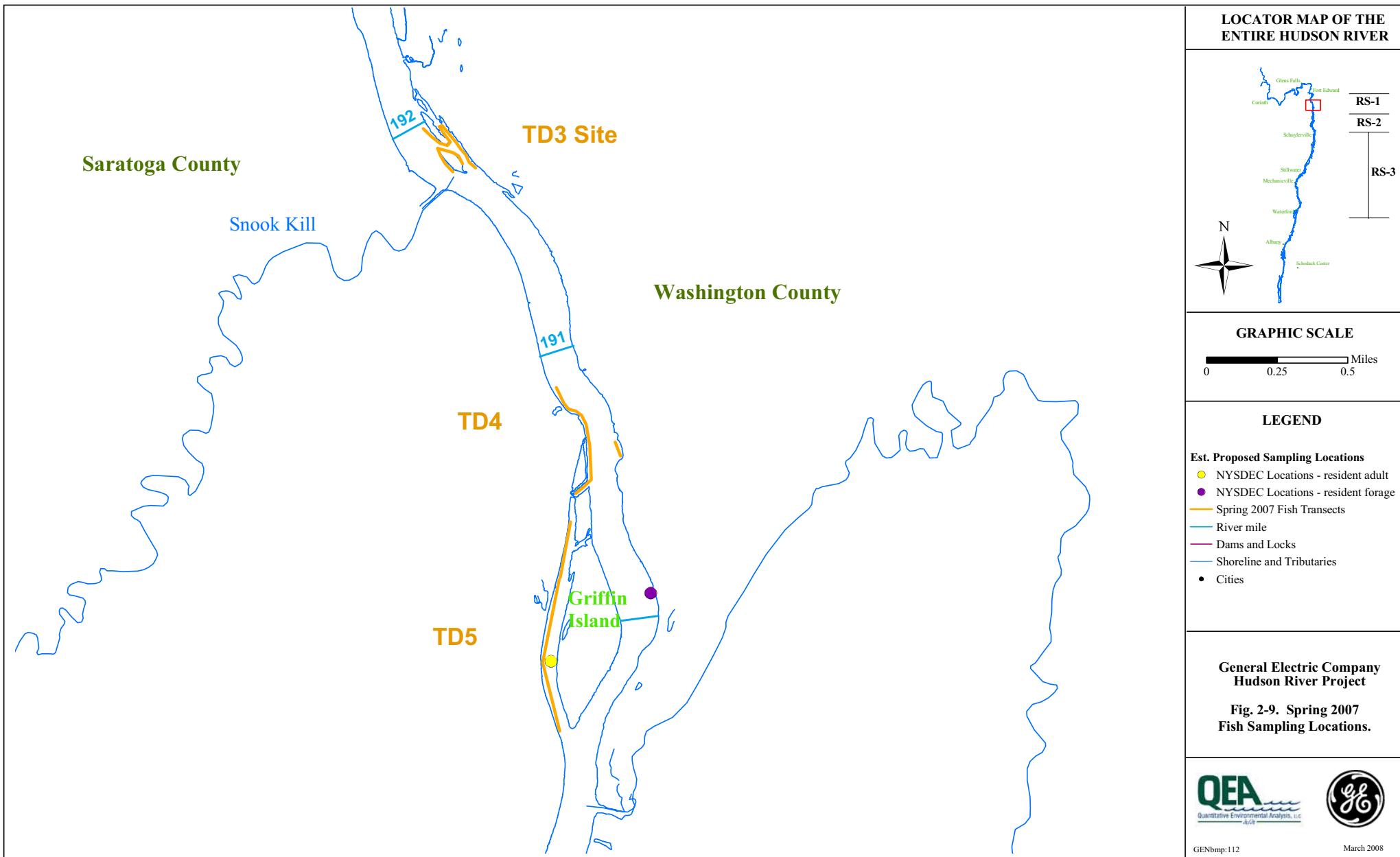


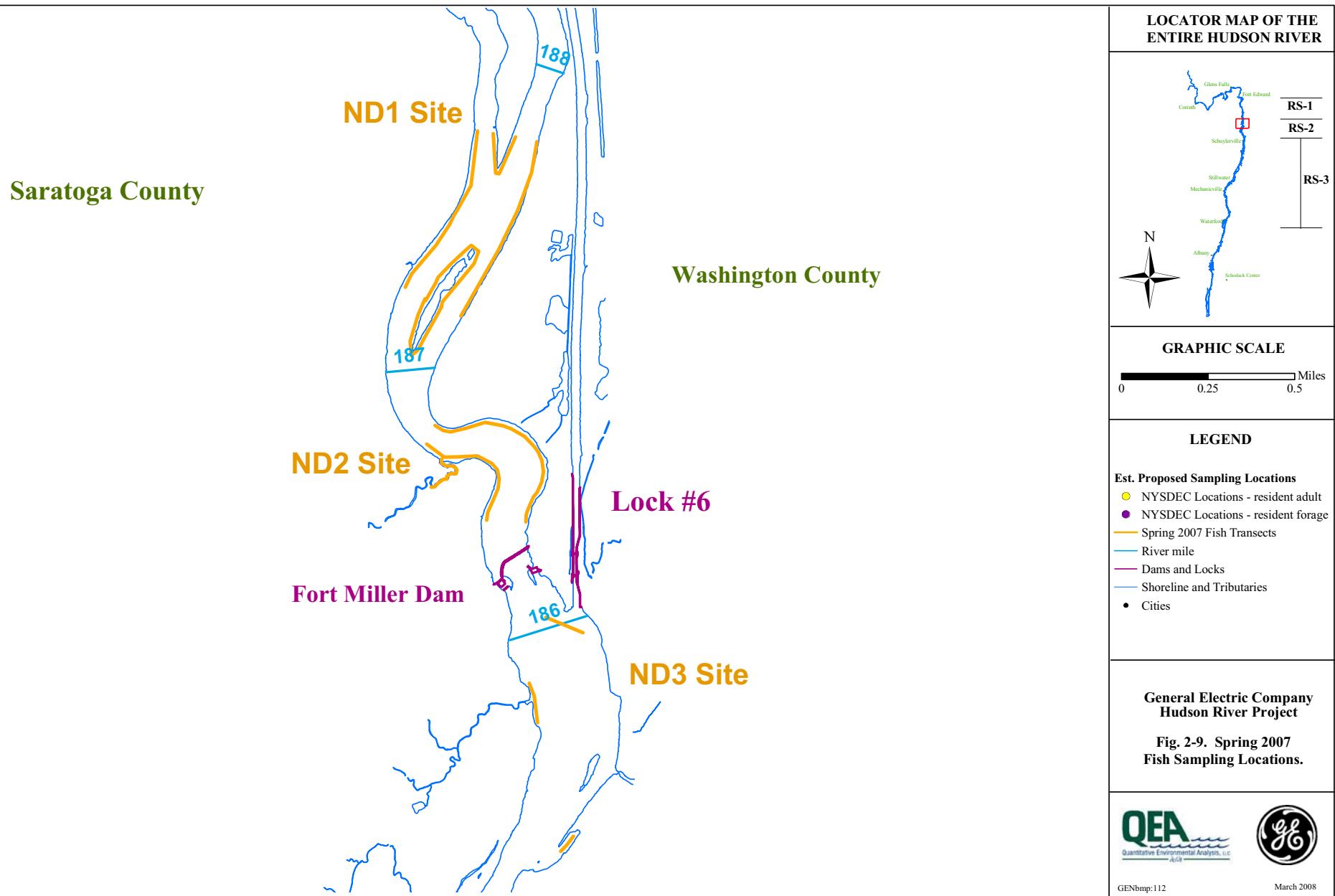
Figure 2-7. Multiple Aliquot Depth Integrated Sampler. (MADIS)

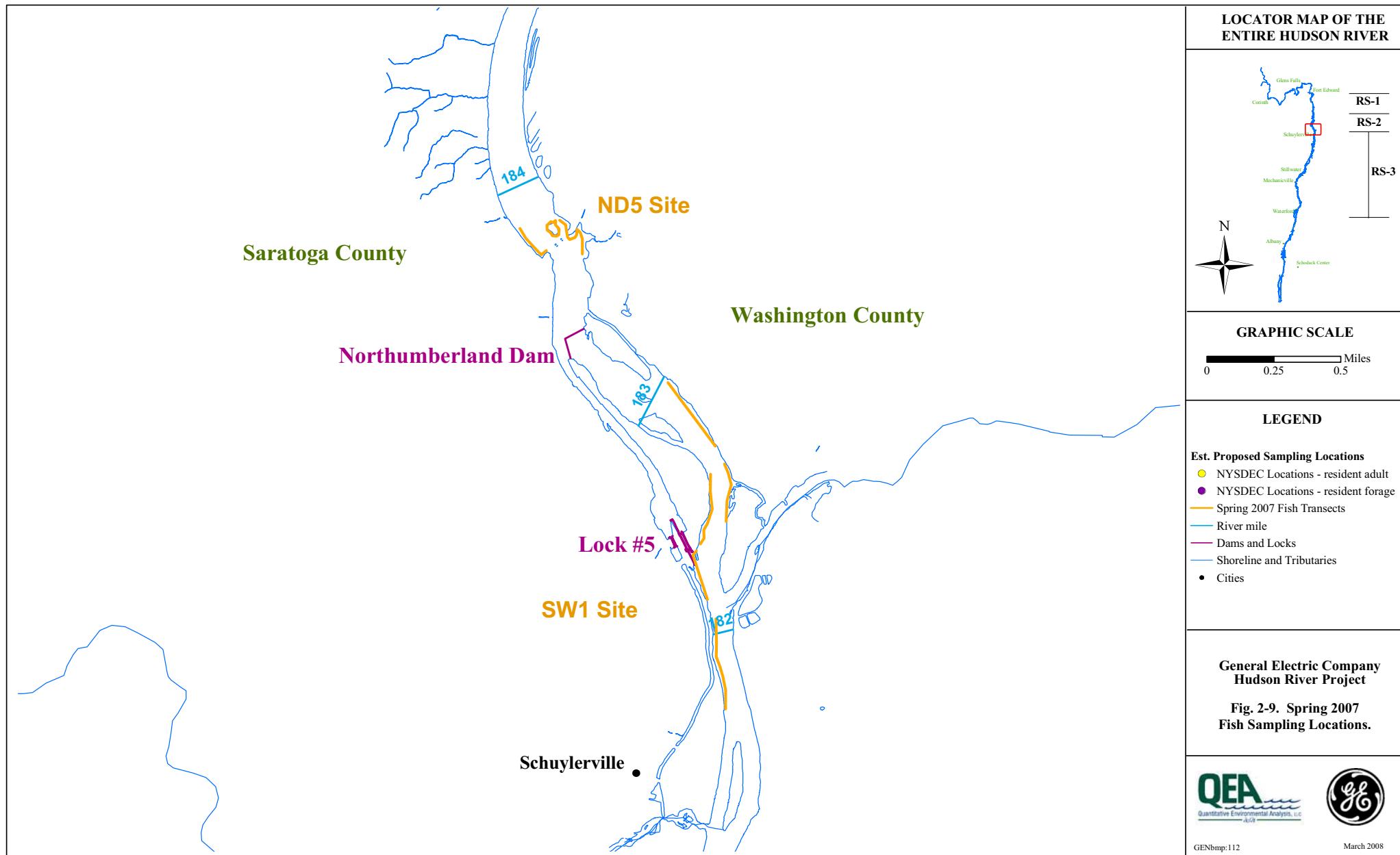


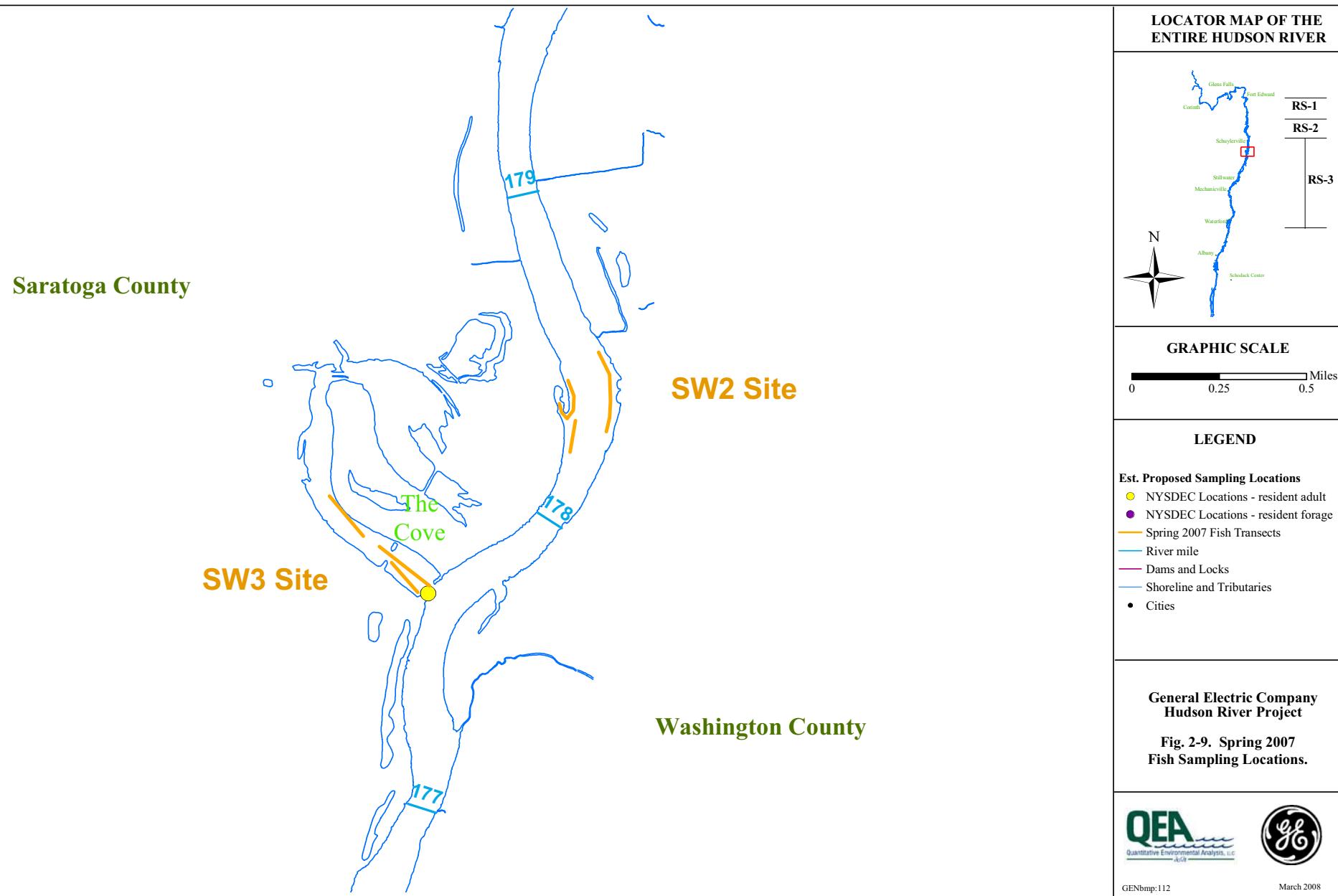


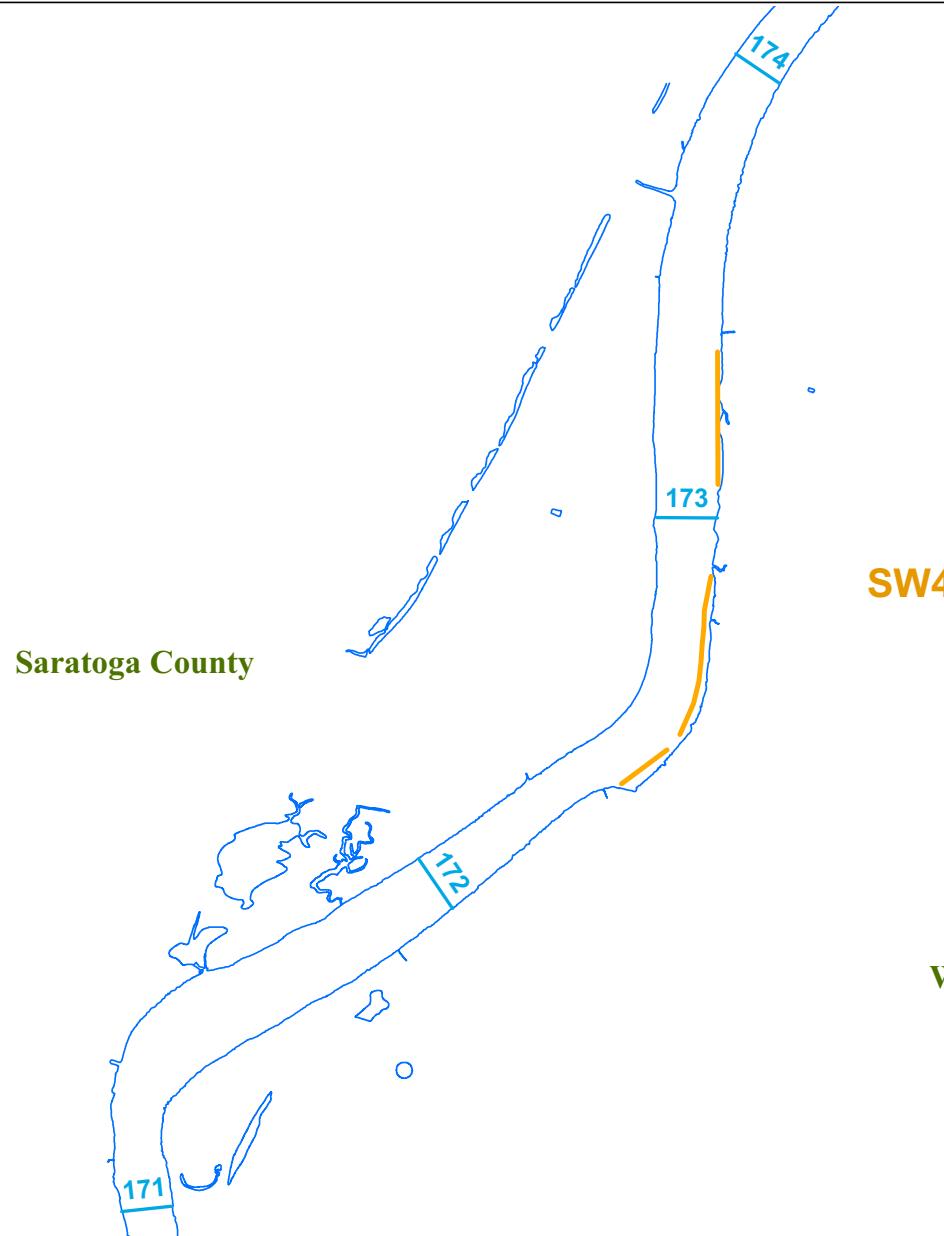




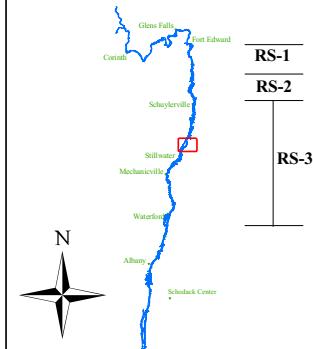




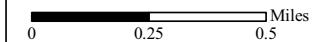




LOCATOR MAP OF THE ENTIRE HUDSON RIVER



GRAPHIC SCALE



LEGEND

- Est. Proposed Sampling Locations**
- NYSDEC Locations - resident adult
 - NYSDEC Locations - resident forage
 - Spring 2007 Fish Transects
 - River mile
 - Dams and Locks
 - Shoreline and Tributaries
 - Cities

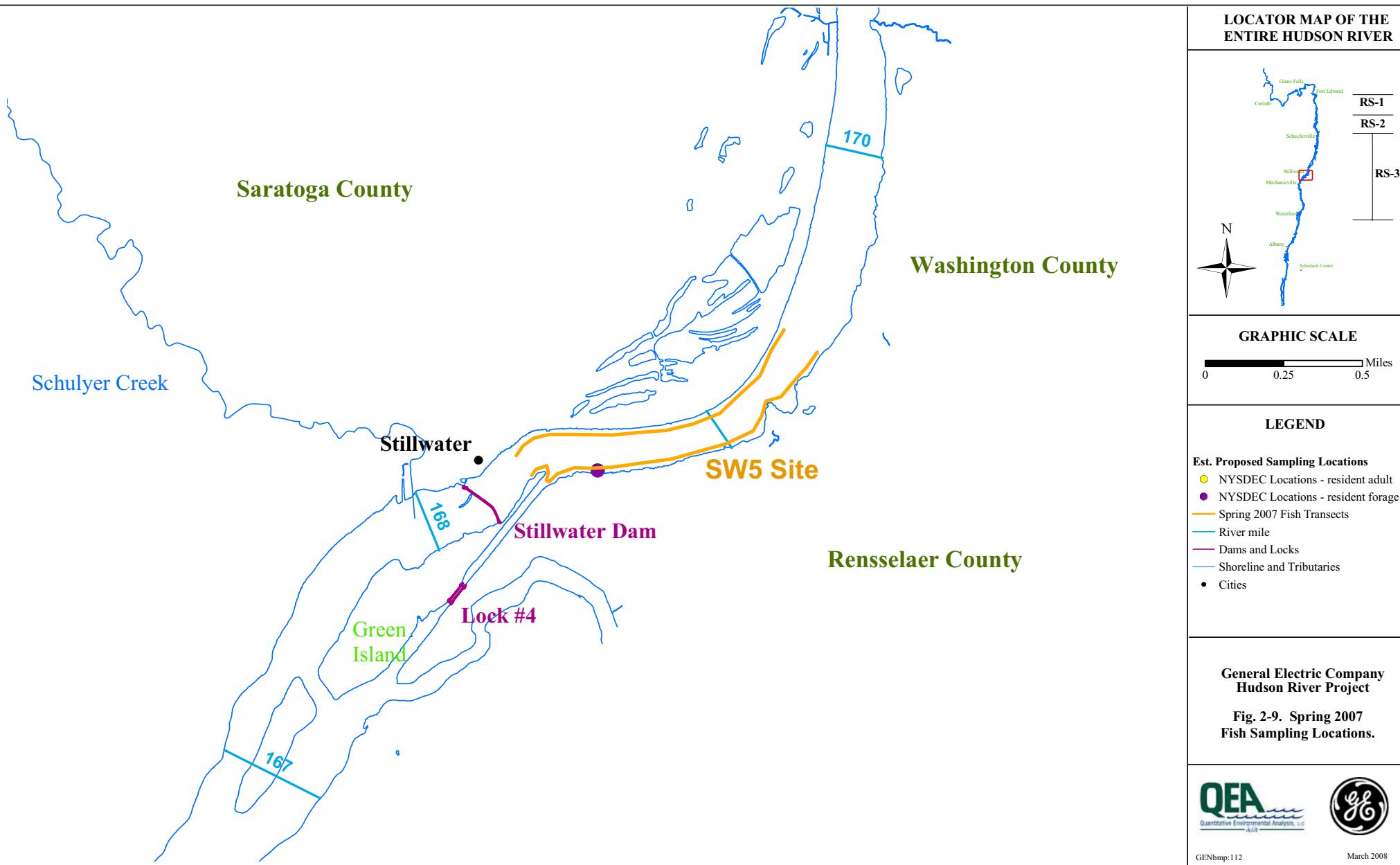
General Electric Company Hudson River Project

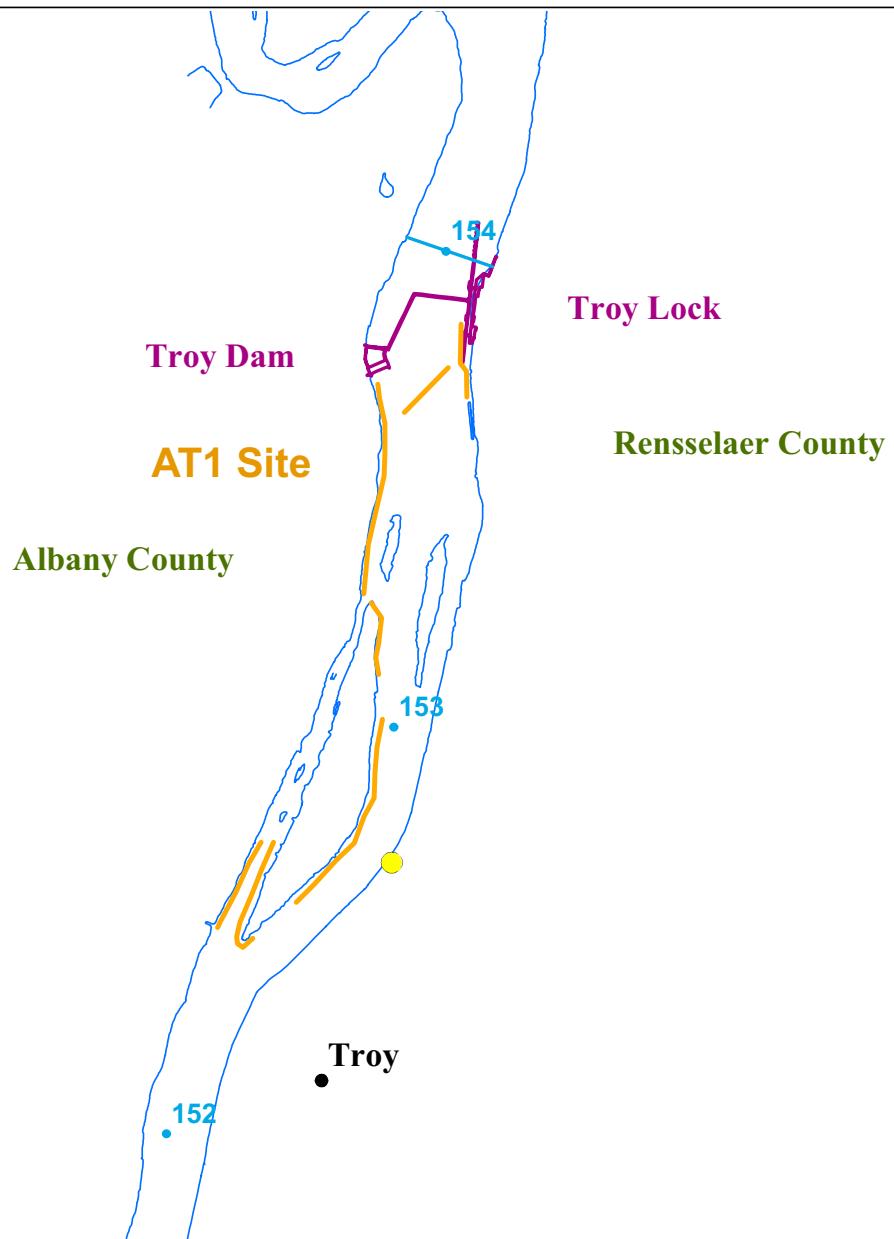
Fig. 2-9. Spring 2007
Fish Sampling Locations.



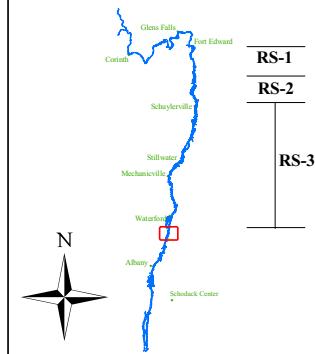
GENbmp:112

March 2008

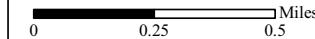




LOCATOR MAP OF THE ENTIRE HUDSON RIVER



GRAPHIC SCALE



LEGEND

- Est. Proposed Sampling Locations**
- NYSDEC Locations - resident adult
 - NYSDEC Locations - resident forage
 - Spring 2007 Fish Transects
 - River mile
 - Dams and Locks
 - Shoreline and Tributaries
 - Cities

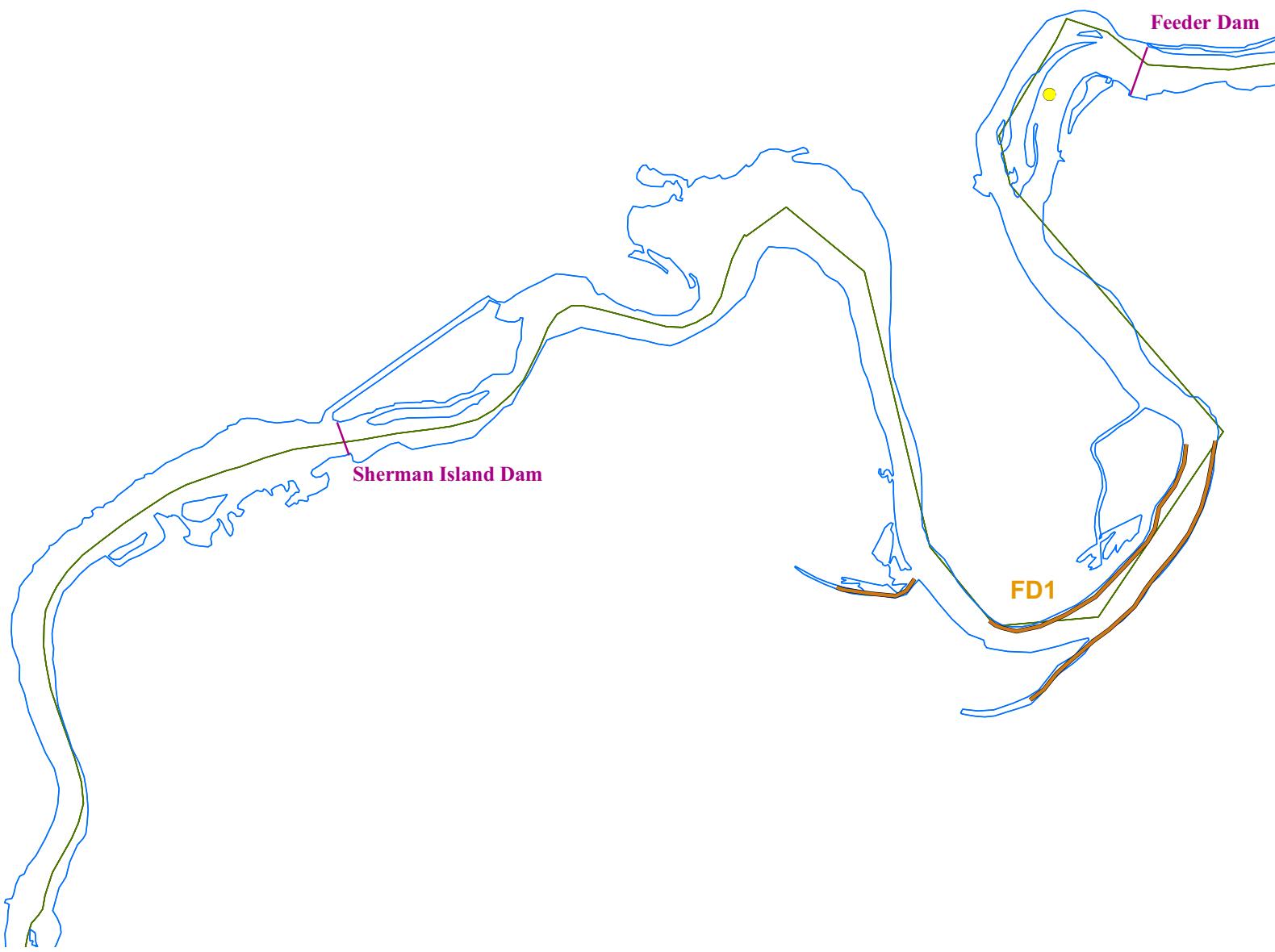
**General Electric Company
Hudson River Project**

**Fig. 2-9. Spring 2007
Fish Sampling Locations.**

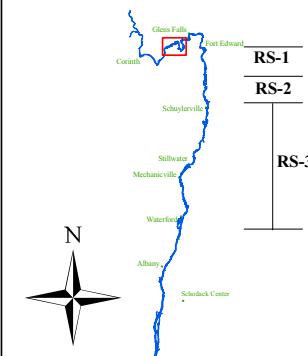


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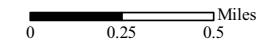
February 2008



LOCATOR MAP OF THE UPPER HUDSON RIVER

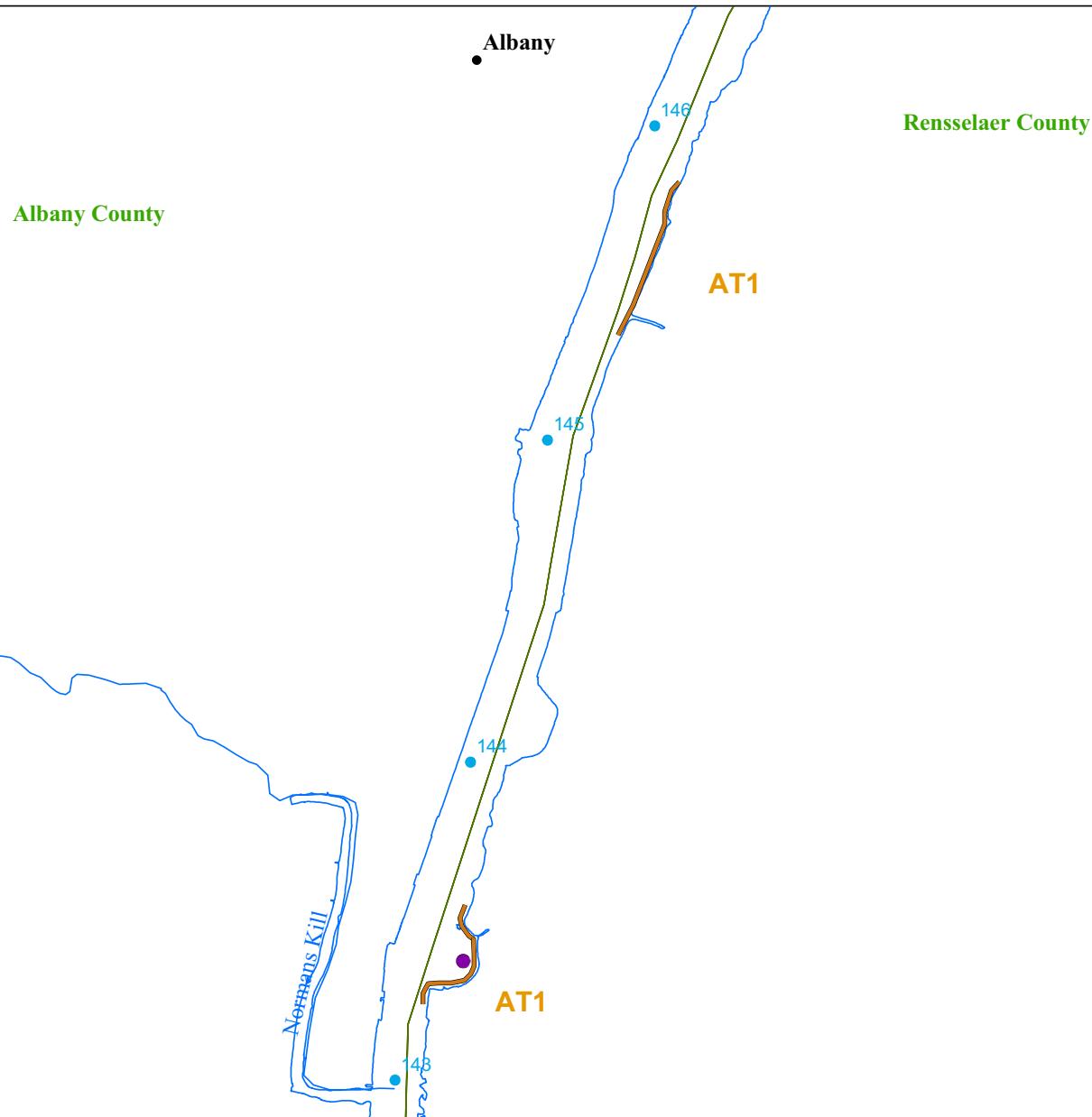


GRAPHIC SCALE

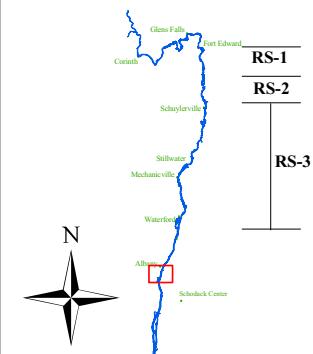


LEGEND

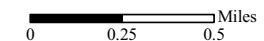
- General Electric Company Hudson River Project**
- Figure 2-10. Autumn 2007 Fish Sampling Locations**
- QEA Quantitative Environmental Analysis, Inc.
 - GE General Electric
- GENbmp:152 March 2008



LOCATOR MAP OF THE UPPER HUDSON RIVER



GRAPHIC SCALE



LEGEND

- Est. Proposed Sampling Locations
- Yellow dot: NYSDEC Locations - resident adult
 - Purple dot: NYSDEC Locations - resident forage
 - Orange line: Autumn2007 Fish Sampling Transects
 - Blue line: River mile
 - Pink line: Dams and Locks
 - Green line: County
 - Blue line: Shoreline and Tributaries
 - Black dot: Cities

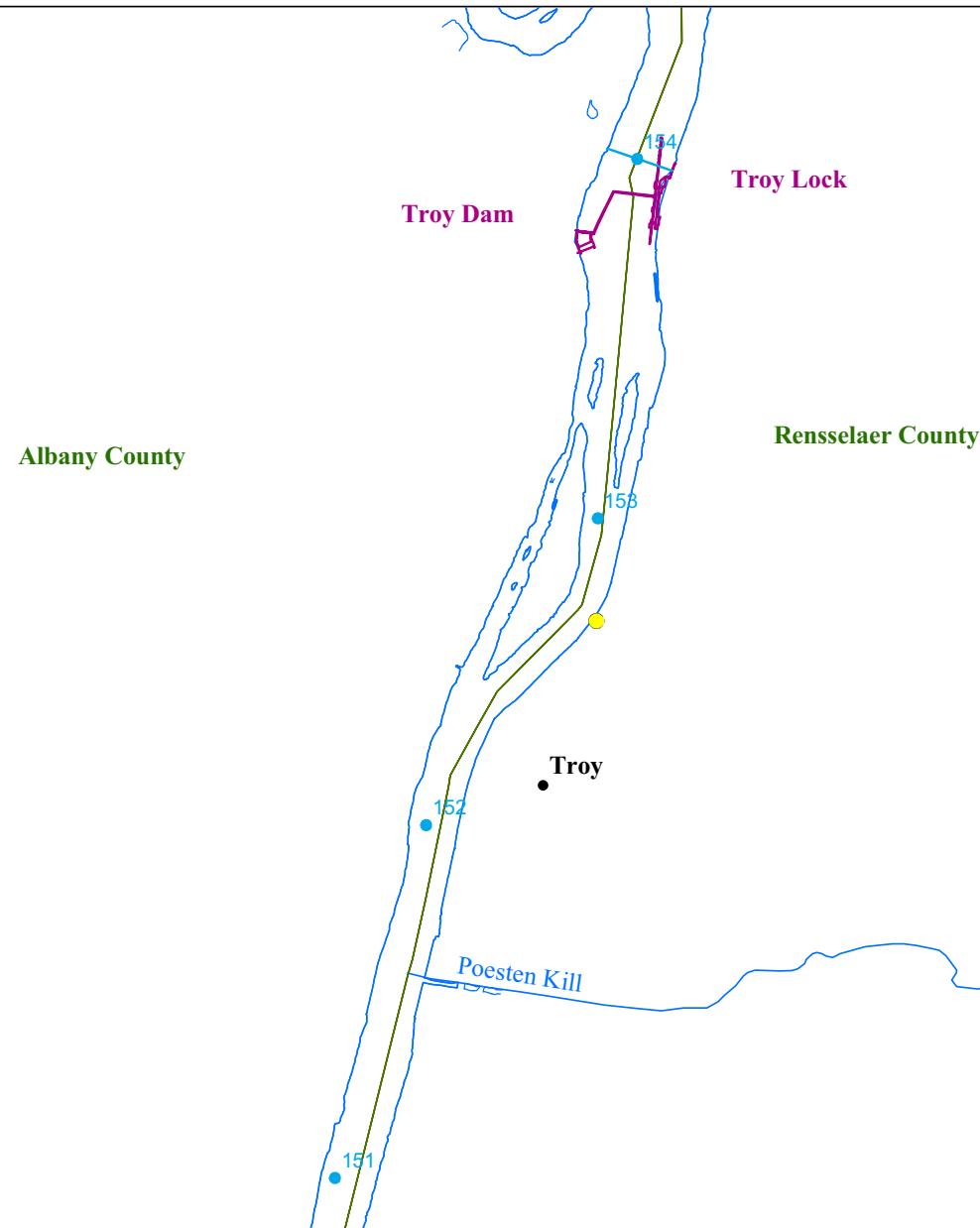
**General Electric Company
Hudson River Project**

**Figure 2-10. Autumn 2007
Fish Sampling Locations**

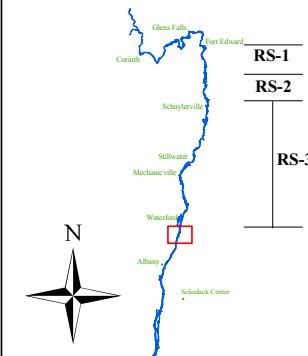


GENbmp:152

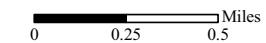
March 2008



LOCATOR MAP OF THE UPPER HUDSON RIVER



GRAPHIC SCALE



LEGEND

- Est. Proposed Sampling Locations
- Yellow dot: NYSDEC Locations - resident adult
 - Purple dot: NYSDEC Locations - resident forage
 - Brown line: Autumn2007 Fish Sampling Transects
 - Blue line: Shoreline and Tributaries
 - Pink line: Dams and Locks
 - Green line: County
 - Blue line: Shoreline and Tributaries
 - Black dot: Cities

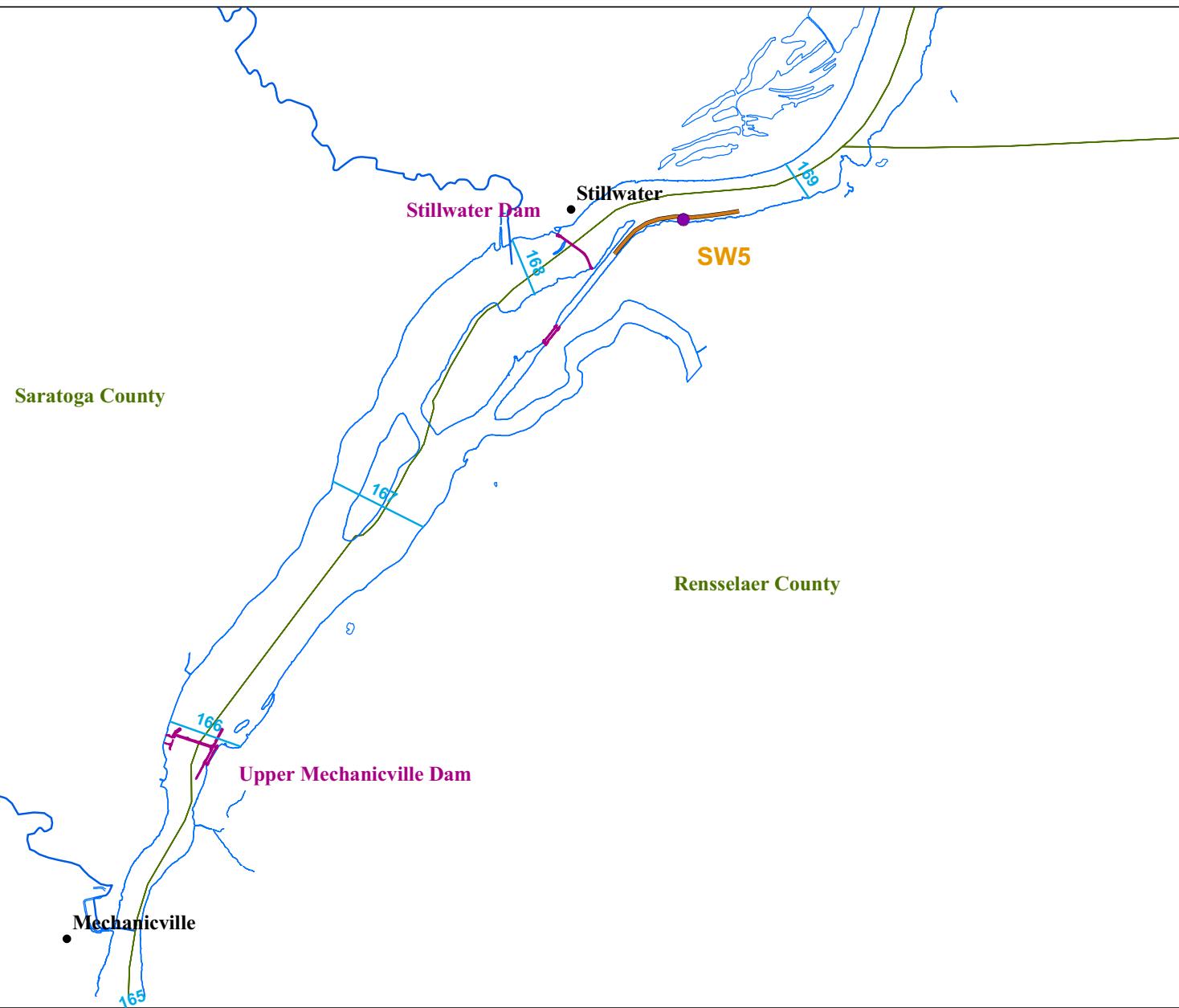
**General Electric Company
Hudson River Project**

**Figure 2-10. Autumn 2007
Fish Sampling Locations**

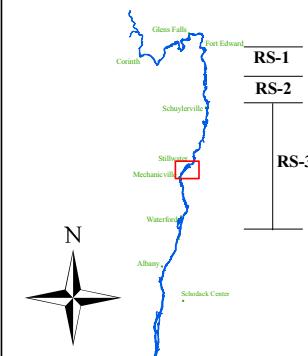


GENbmp:152

March 2008



LOCATOR MAP OF THE UPPER HUDSON RIVER



GRAPHIC SCALE



LEGEND

- Est. Proposed Sampling Locations
- NYSDEC Locations - resident adult
 - NYSDEC Locations - resident forage
 - Autumn2007 Fish Sampling Transects
 - River mile
 - Dams and Locks
 - County
 - Shoreline and Tributaries
 - Cities

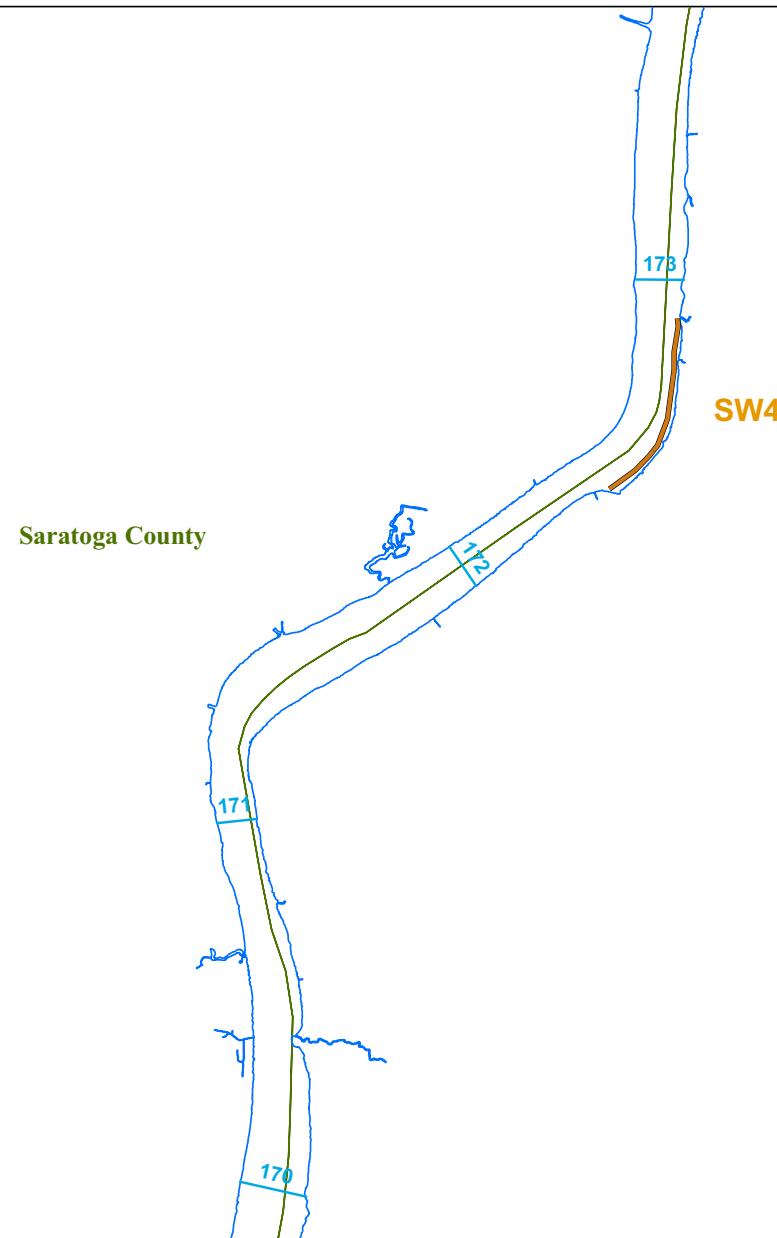
General Electric Company
Hudson River Project

Figure 2-10. Autumn 2007
Fish Sampling Locations



GENbmp:152

March 2008

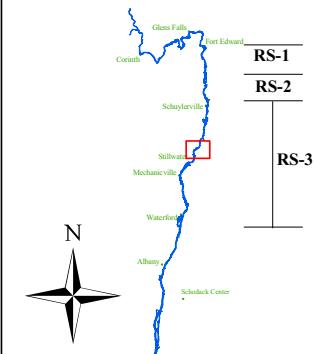


Washington County

Saratoga County

SW4

LOCATOR MAP OF THE UPPER HUDSON RIVER



GRAPHIC SCALE



LEGEND

- Est. Proposed Sampling Locations
- NYSDEC Locations - resident adult
 - NYSDEC Locations - resident forage
 - Autumn2007 Fish Sampling Transects
 - River mile
 - Dams and Locks
 - County
 - Shoreline and Tributaries
 - Cities

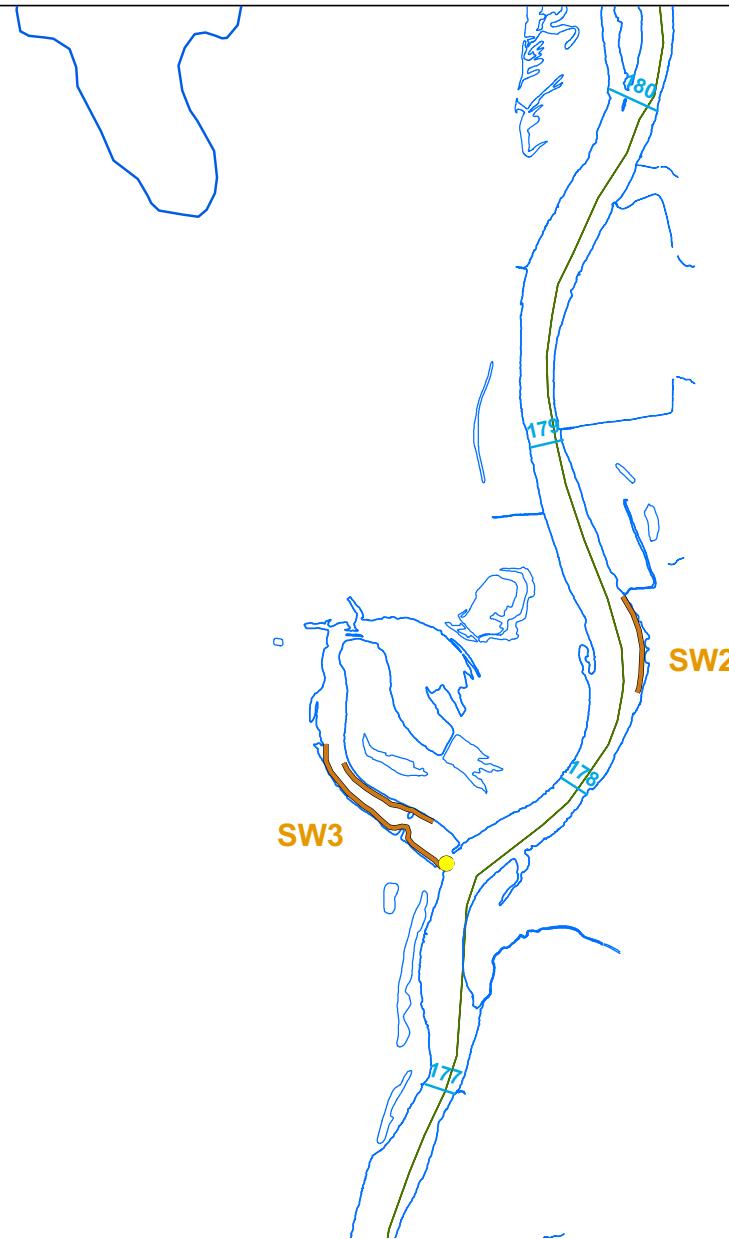
**General Electric Company
Hudson River Project**

**Figure 2-10. Autumn 2007
Fish Sampling Locations**

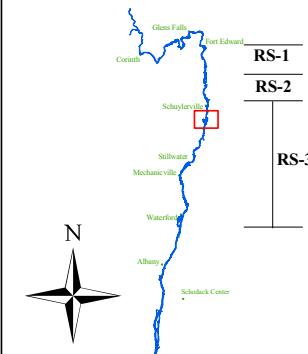


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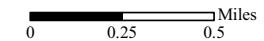
March 2008



LOCATOR MAP OF THE UPPER HUDSON RIVER



GRAPHIC SCALE



LEGEND

- Est. Proposed Sampling Locations**
- NYSDEC Locations - resident adult
 - NYSDEC Locations - resident forage
 - Autumn2007 Fish Sampling Transects
 - River mile
 - Dams and Locks
 - County
 - Shoreline and Tributaries
 - Cities

**General Electric Company
Hudson River Project**

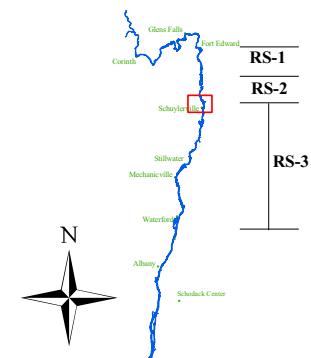
**Figure 2-10. Autumn 2007
Fish Sampling Locations**



GENbmp:152

March 2008

**LOCATOR MAP OF THE
UPPER HUDSON RIVER**



GRAPHIC SCALE



LEGEND

- Est. Proposed Sampling Locations
- NYSDEC Locations - resident adult
 - NYSDEC Locations - resident forage
 - Autumn2007 Fish Sampling Transects
 - River mile
 - Dams and Locks
 - County
 - Shoreline and Tributaries
 - Cities

**General Electric Company
Hudson River Project**

**Figure 2-10. Autumn 2007
Fish Sampling Locations**



GENbmp:152

March 2008

Saratoga County

Washington County

Fish Creek

Schuylerville

Fish Creek

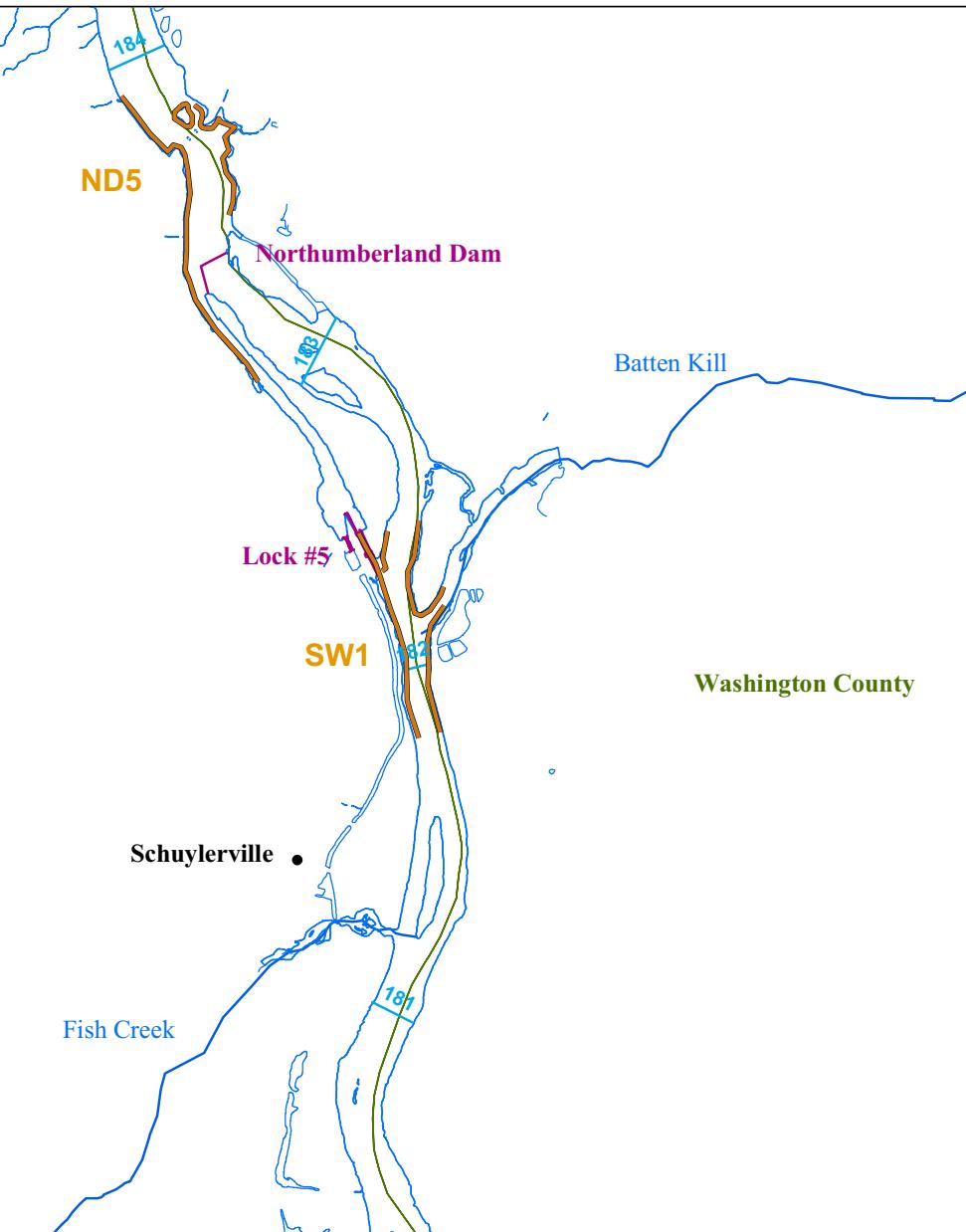
ND5

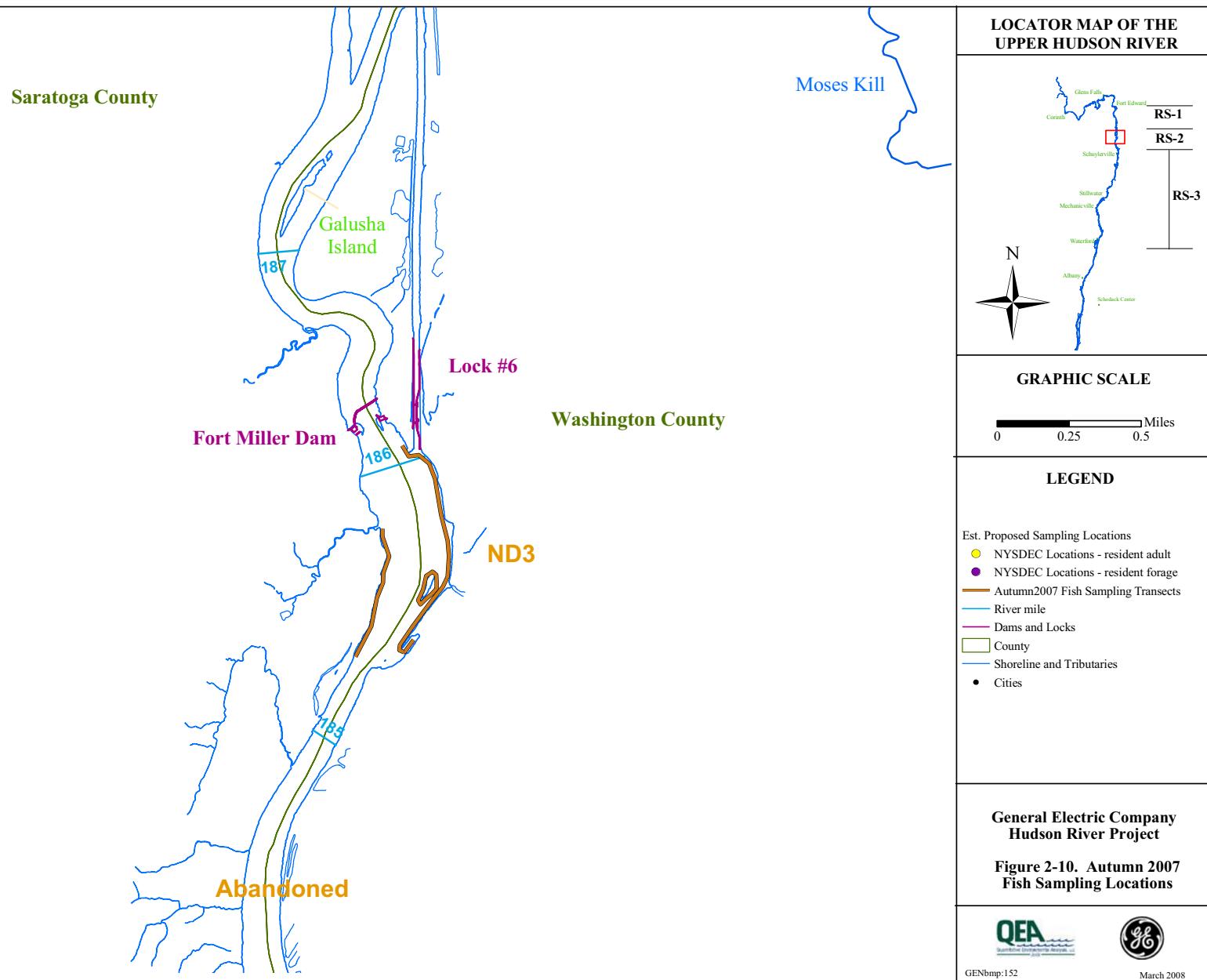
Northumberland Dam

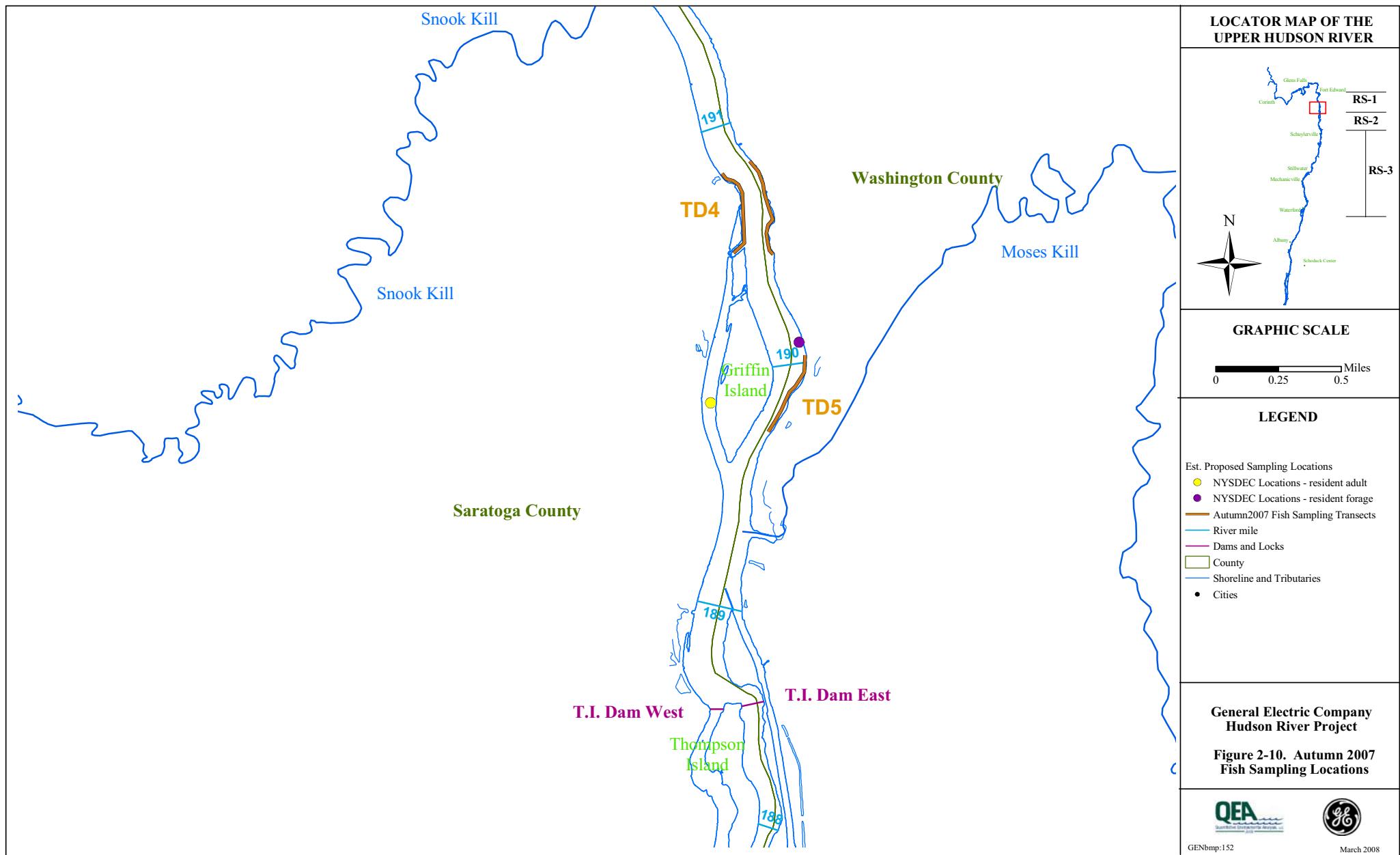
Lock #5

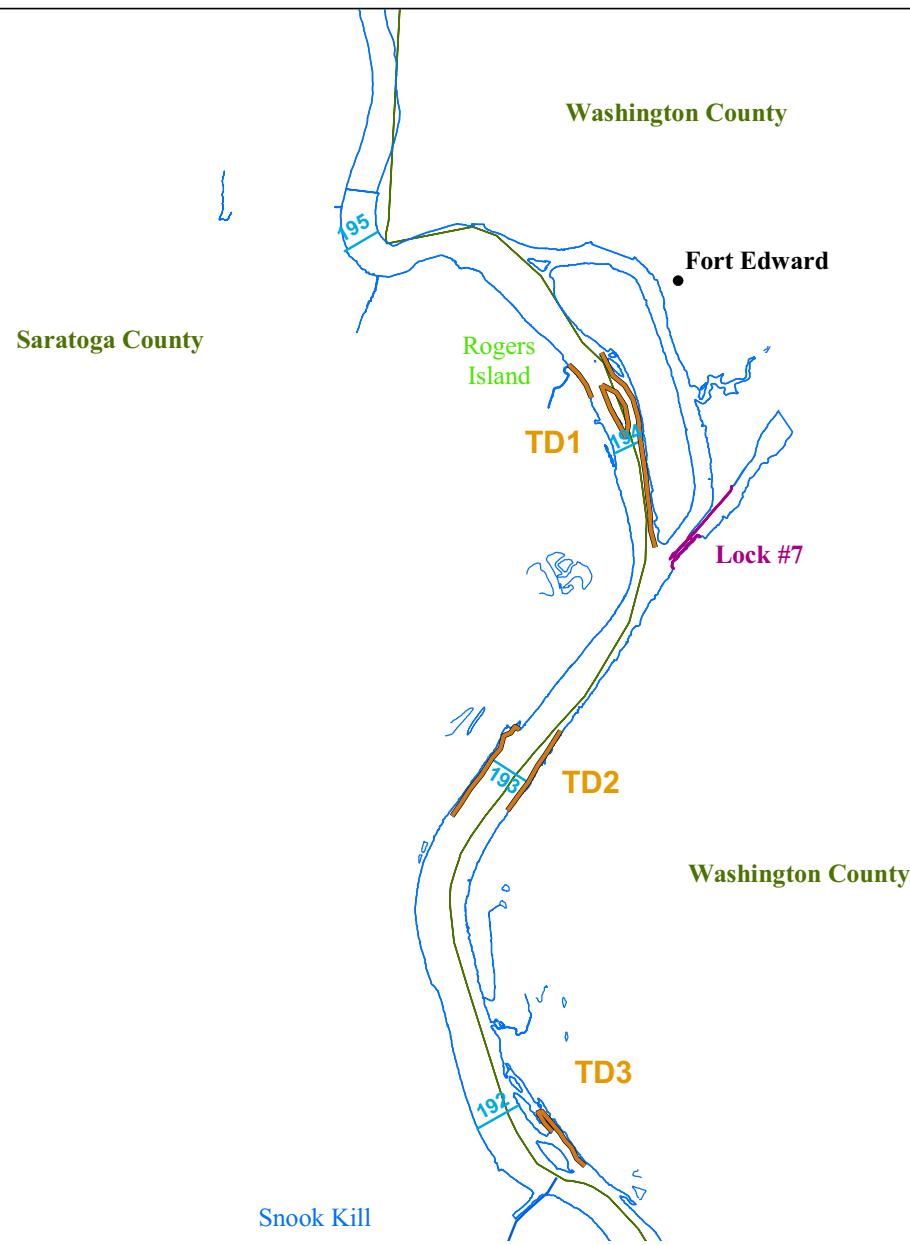
SW1

Batten Kill

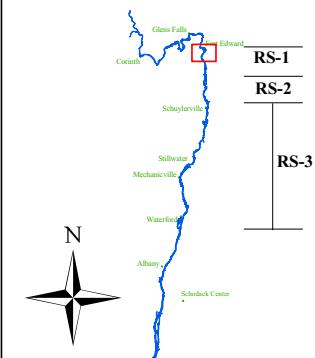








LOCATOR MAP OF THE UPPER HUDSON RIVER



GRAPHIC SCALE

0 0.25 0.5 Miles

LEGEND

- Est. Proposed Sampling Locations
 - NYSDEC Locations - resident adult
 - NYSDEC Locations - resident forage
 - Autumn2007 Fish Sampling Transects
- River mile
- Dams and Locks
- County
- Shoreline and Tributaries
- Cities

**General Electric Company
Hudson River Project**

**Figure 2-10. Autumn 2007
Fish Sampling Locations**



GENbmp:152

March 2008

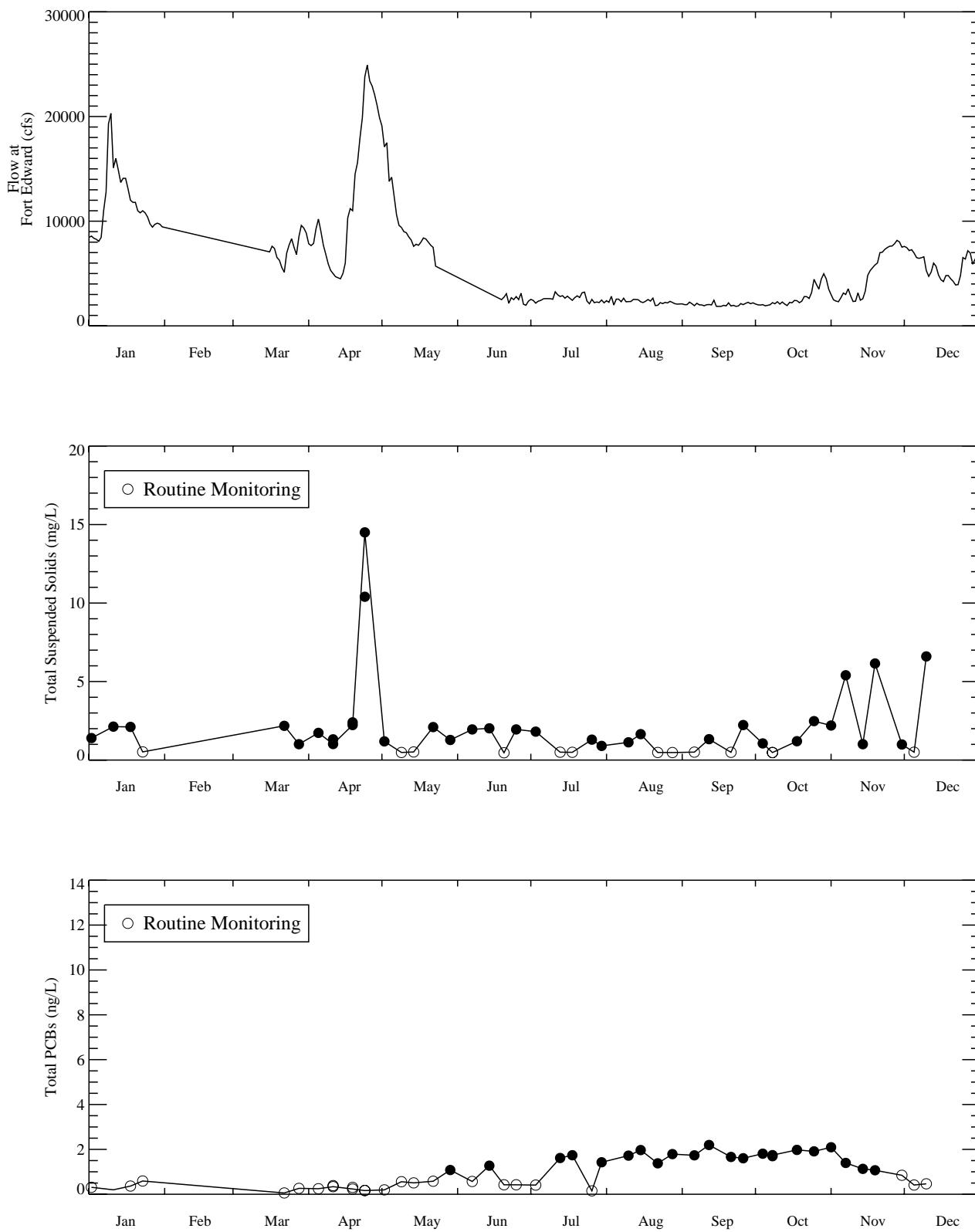


Figure 4-1. 2007 Temporal profiles of PCB and TSS results at Bakers Falls.

Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

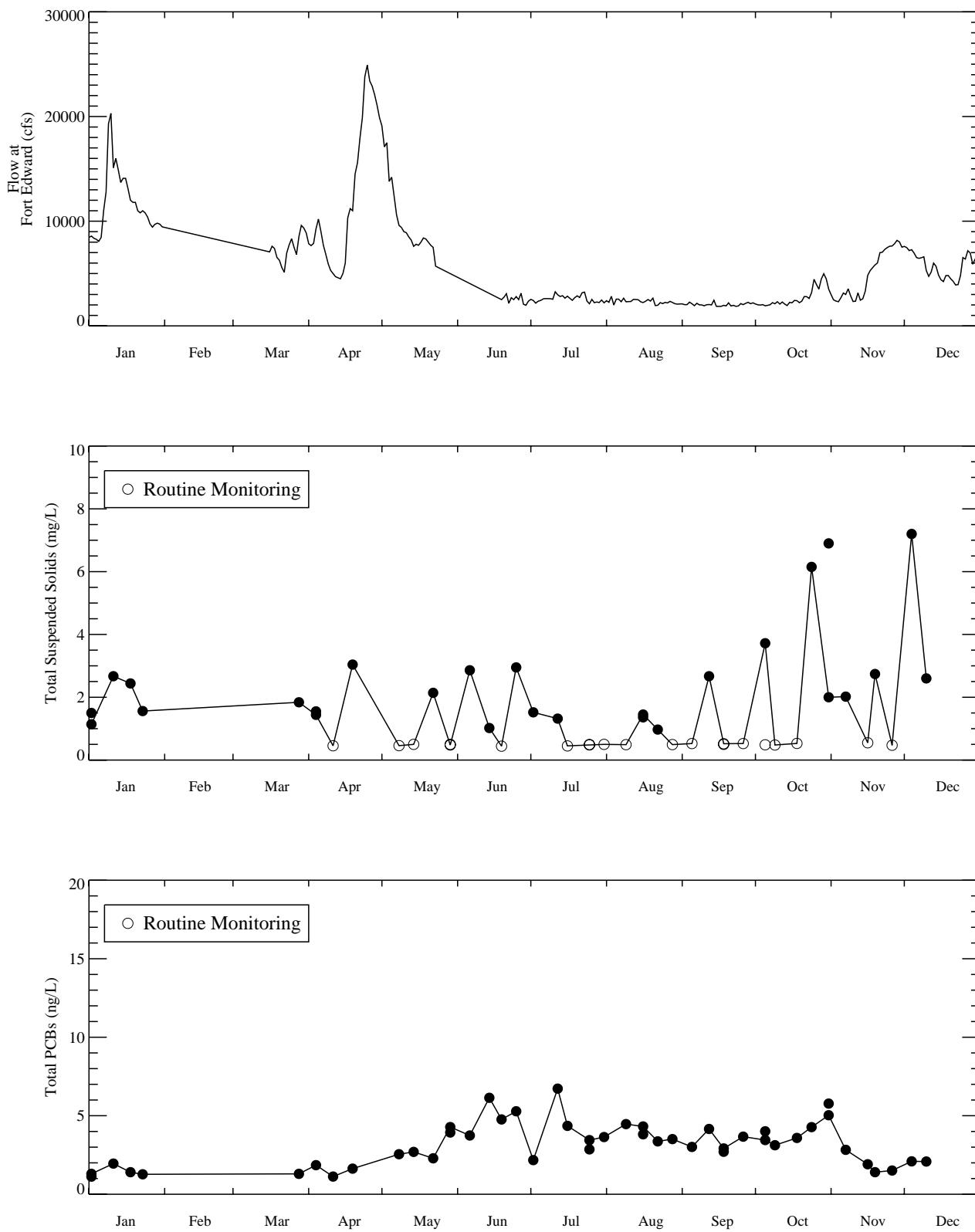


Figure 4-2. 2007 Temporal profiles of PCB and TSS results at Rogers Island.
Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

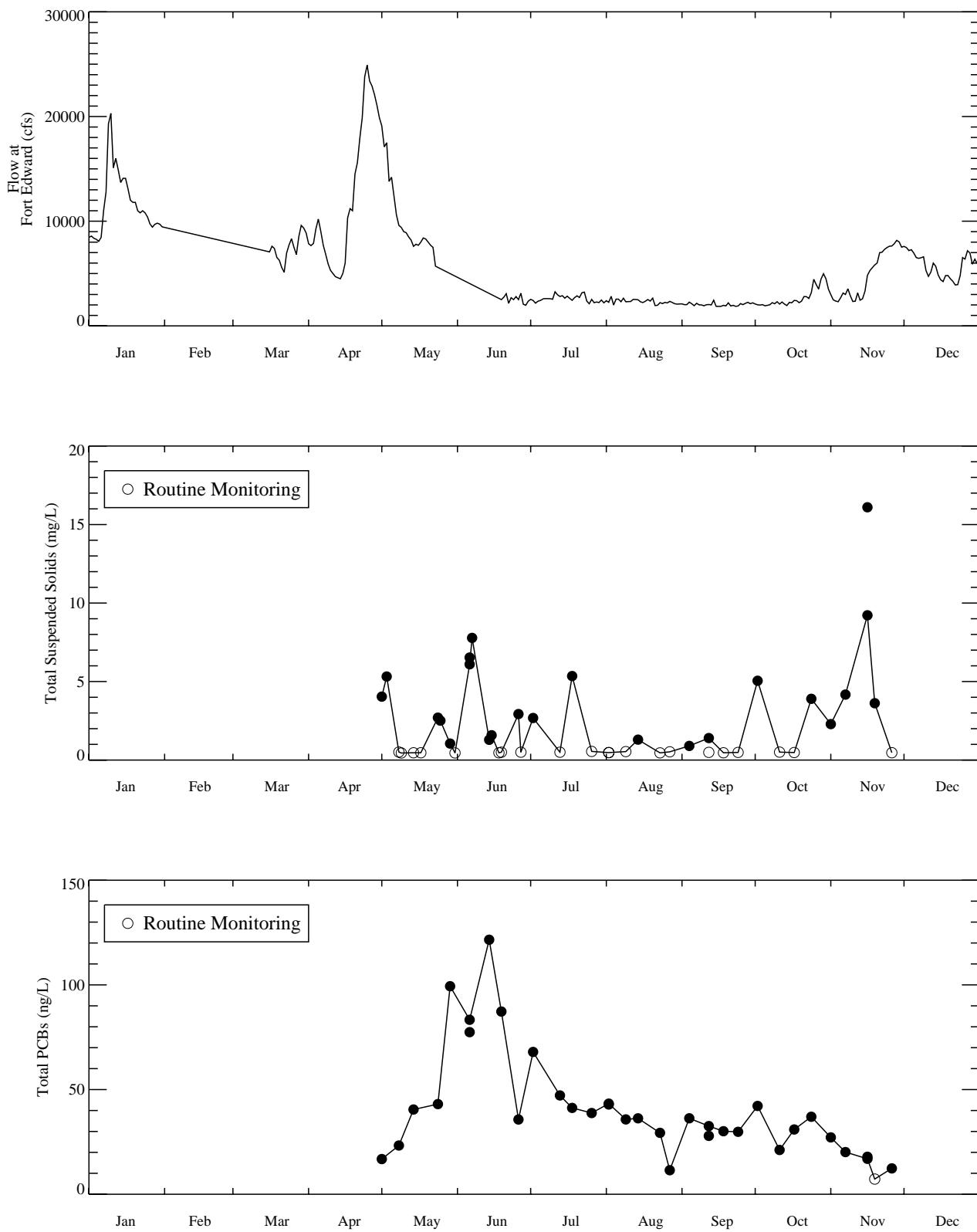


Figure 4-3. 2007 Temporal profiles of PCB and TSS results at Thompson Island.
Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

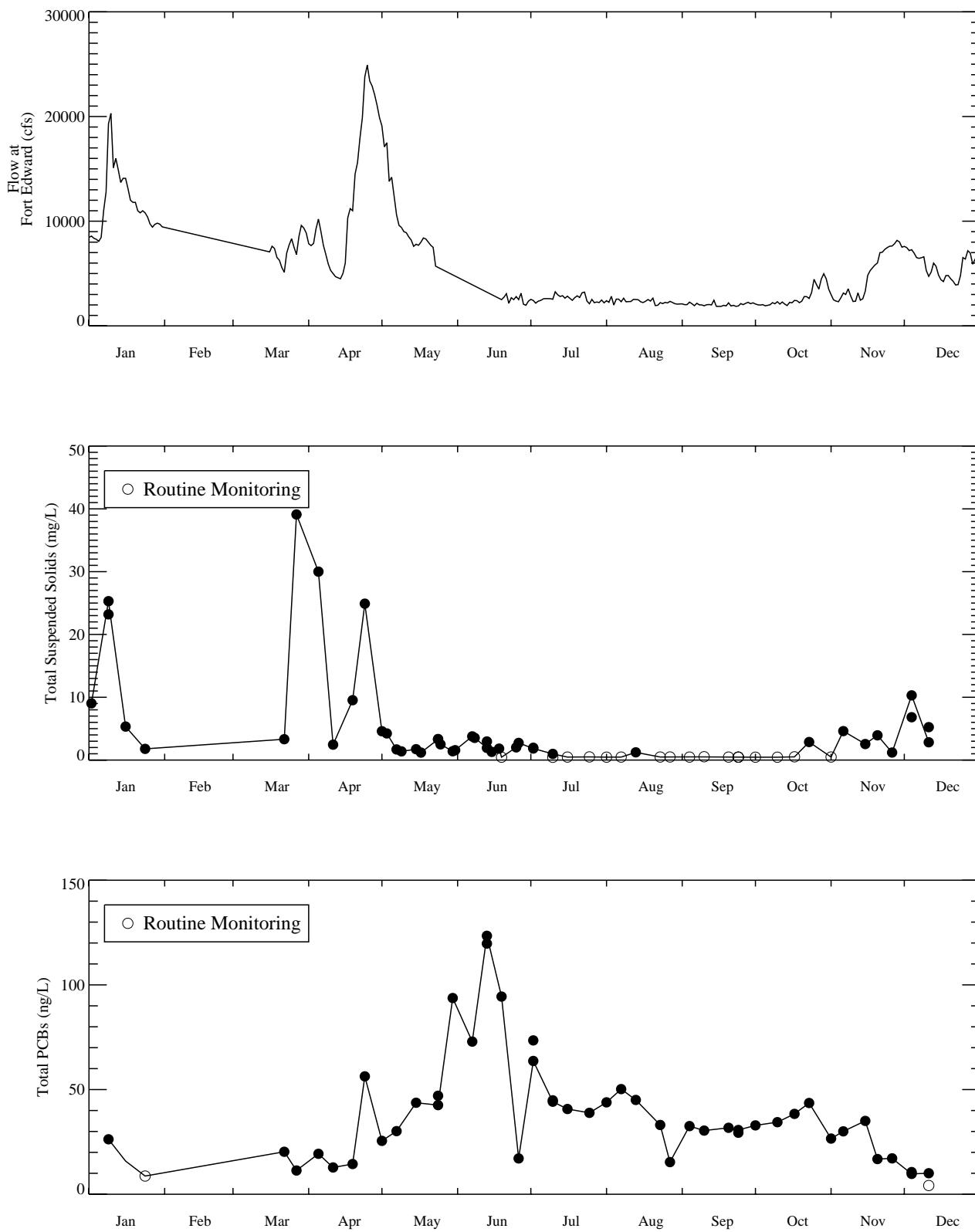


Figure 4-4. 2007 Temporal profiles of PCB and TSS results at Schuylerville.
Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

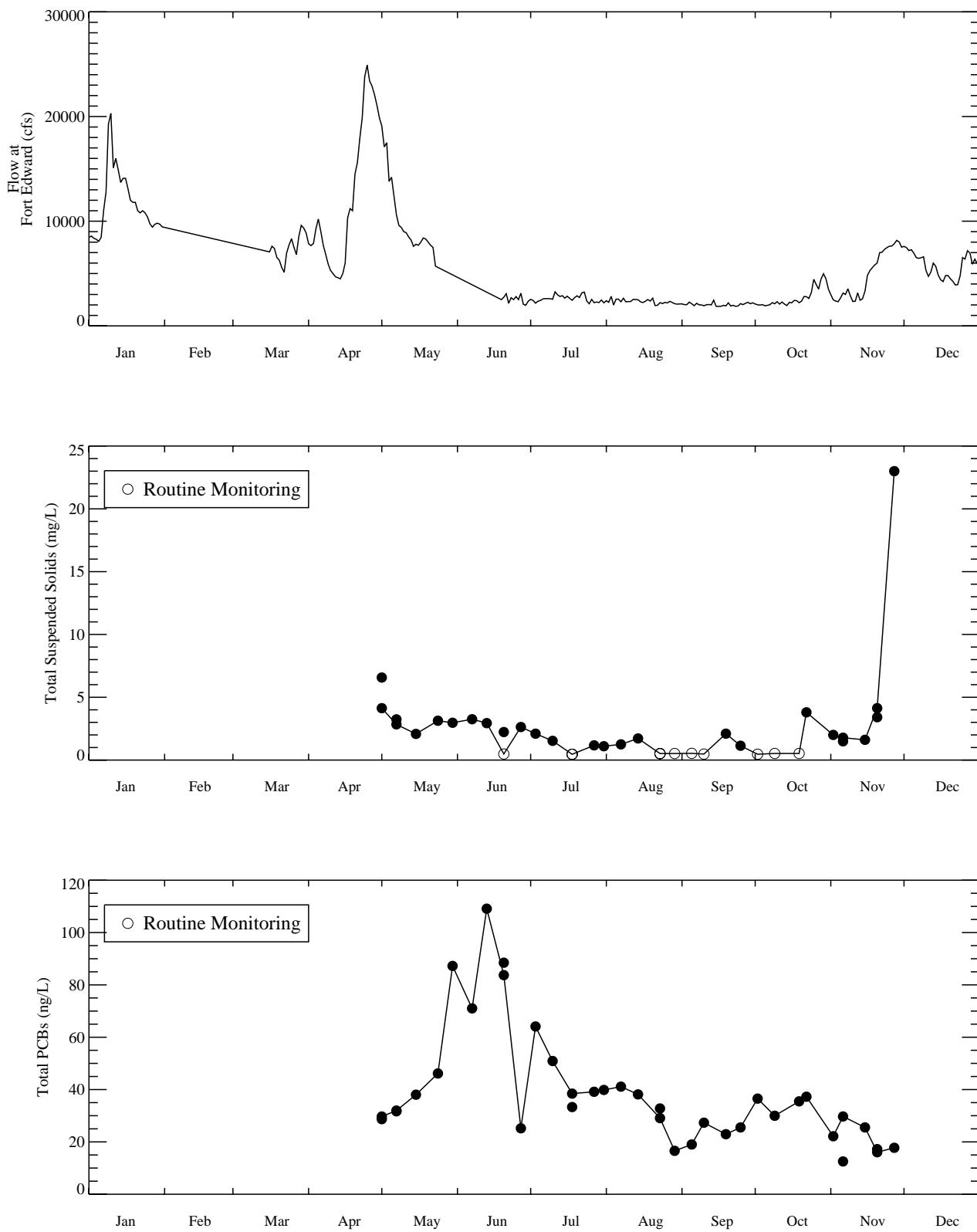


Figure 4-5. 2007 Temporal profiles of PCB and TSS results at Stillwater.

Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

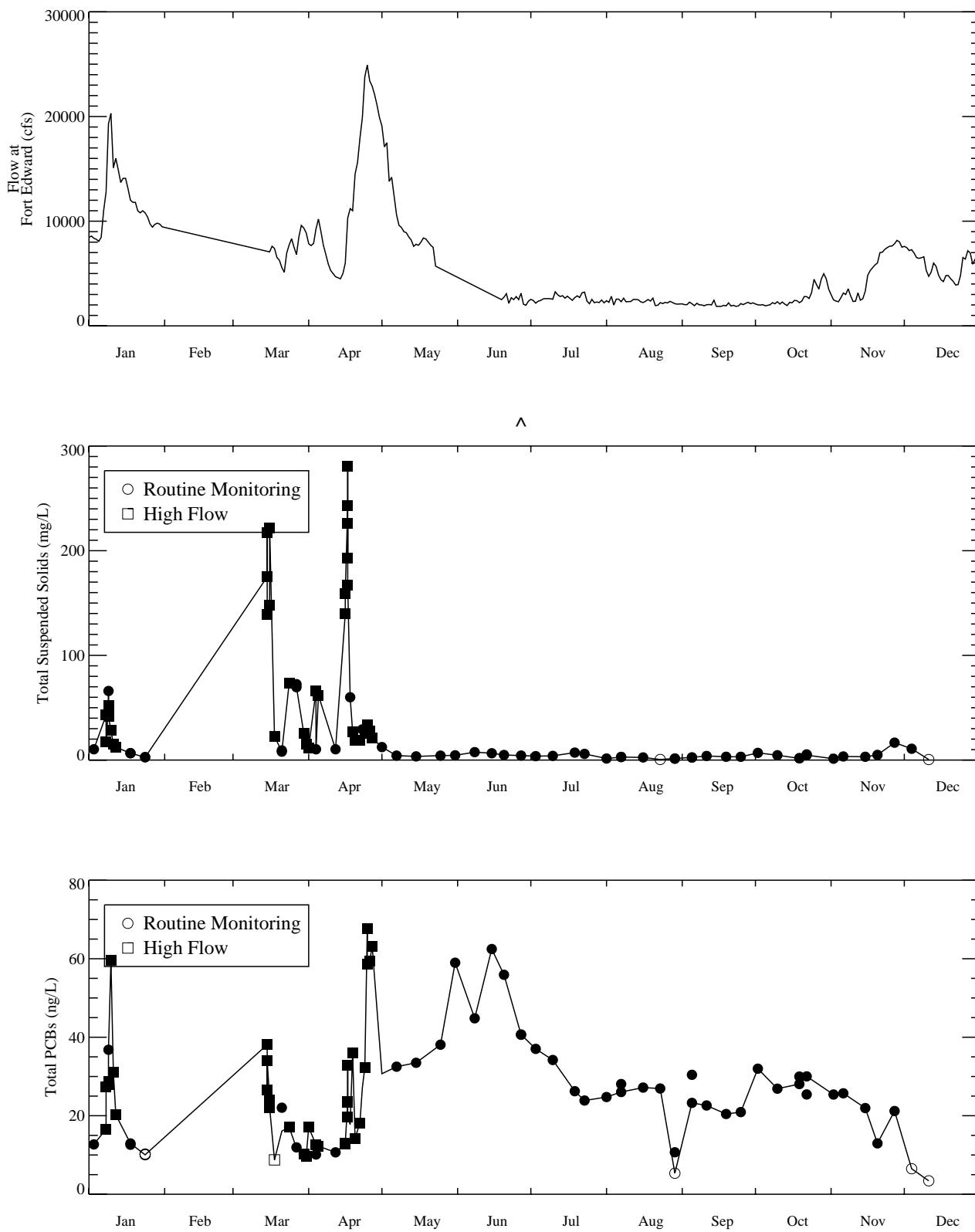


Figure 4-6. 2007 Temporal profiles of PCB and TSS results at Waterford.
Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

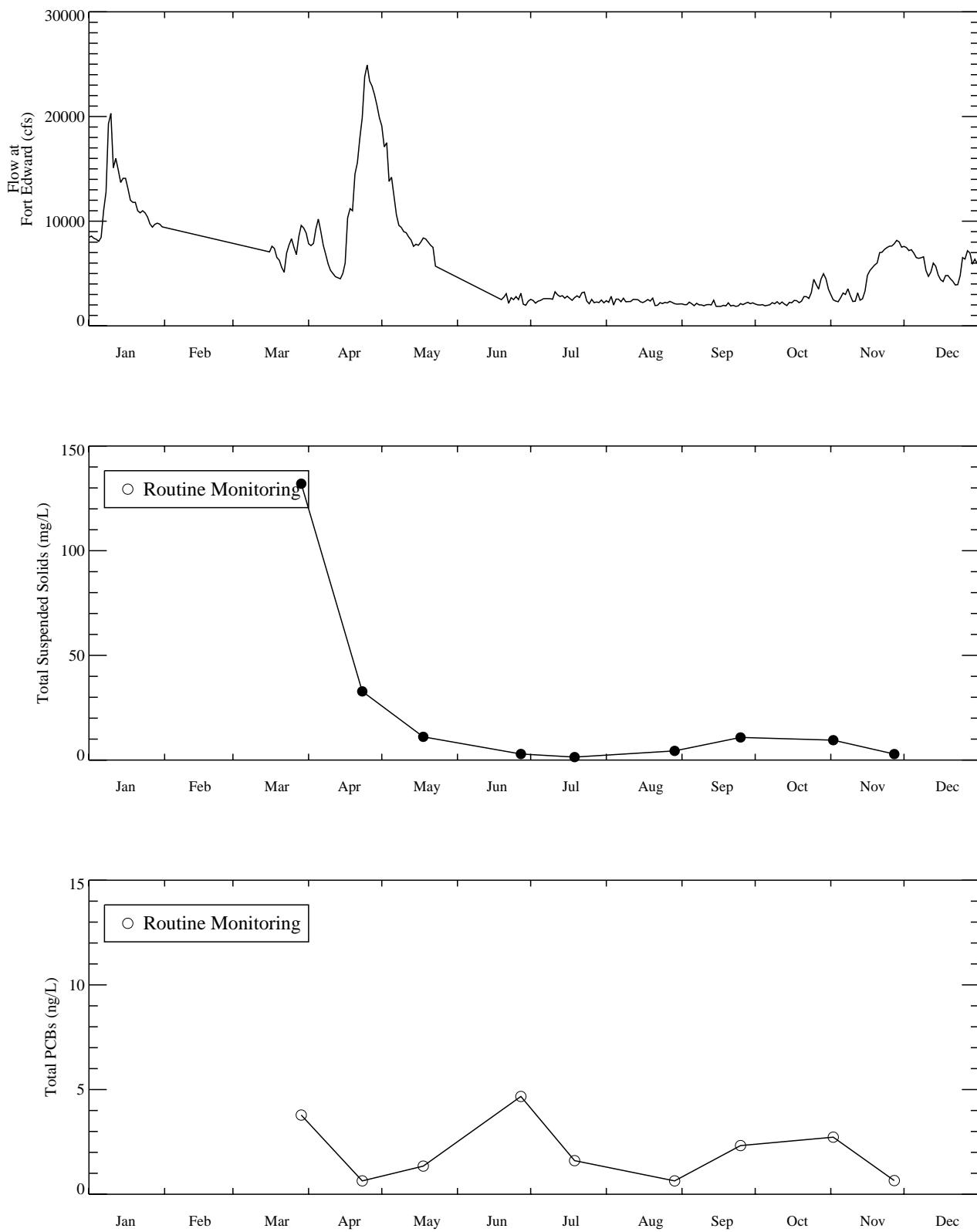


Figure 4-7. 2007 Temporal profiles of PCB and TSS results at Mohawk River.
Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

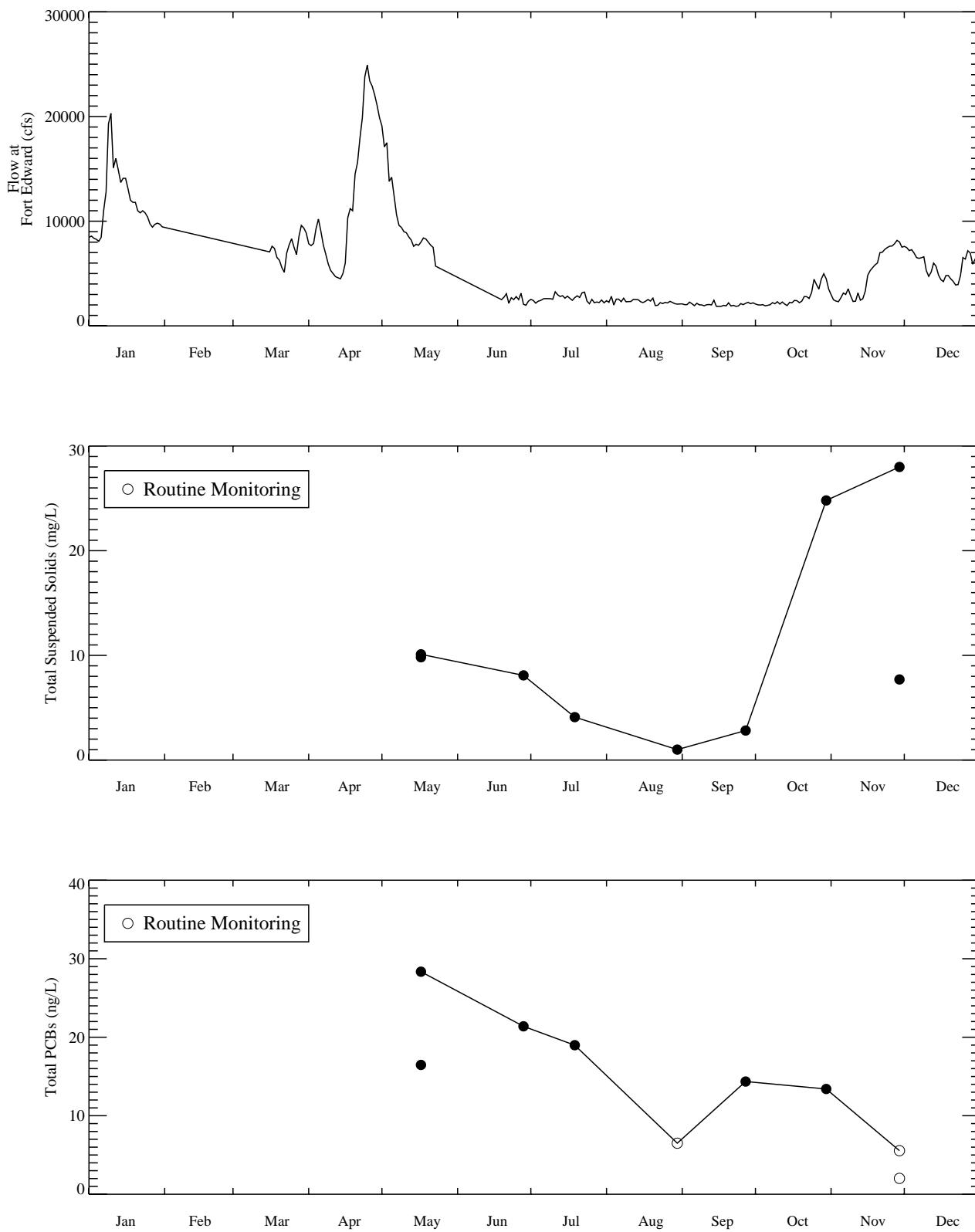


Figure 4-8. 2007 Temporal profiles of PCB and TSS results at Albany.
Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

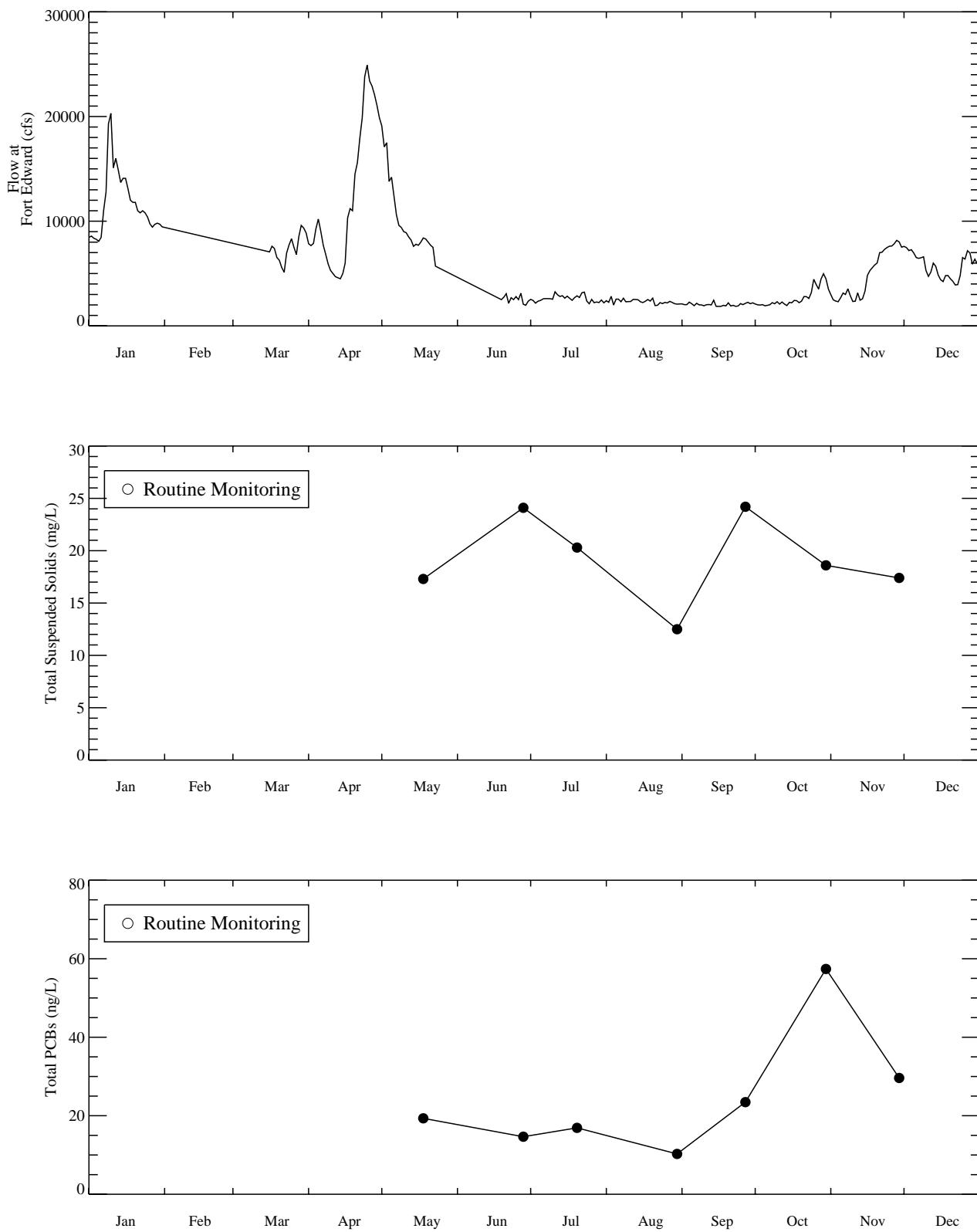


Figure 4-9. 2007 Temporal profiles of PCB and TSS results at Poughkeepsie.
Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

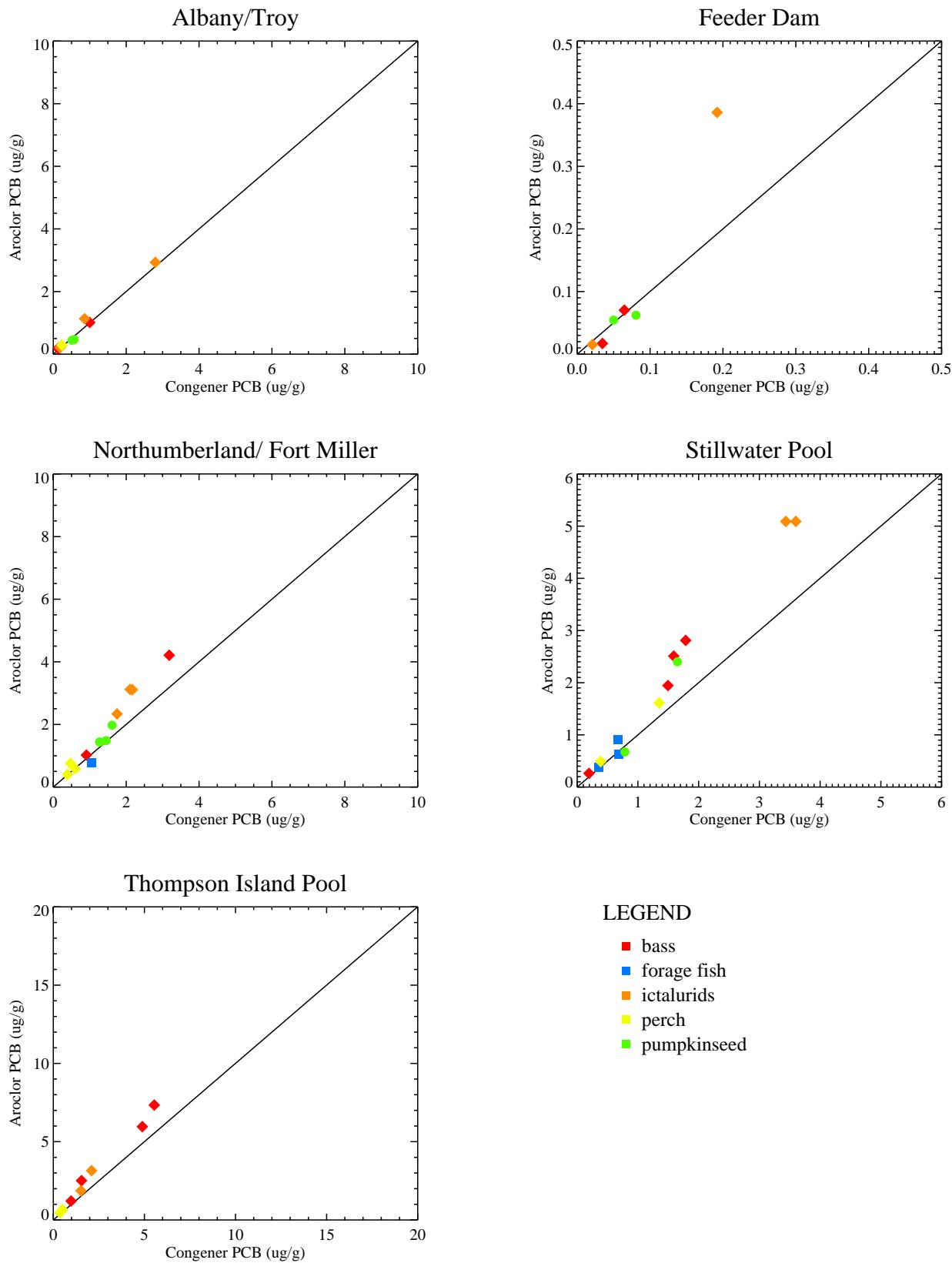


Figure 5-1. Comparison of congener-specific PCB data with Aroclor PCB in fish.

Non-detect values were set to half the method detection limit.
 Prep: diamonds = SF; circles = whole body (individual); squares = whole body (composite).
 Year: 2007.
 Source: BMP (QEAEExport_Fish 01/07/2008).

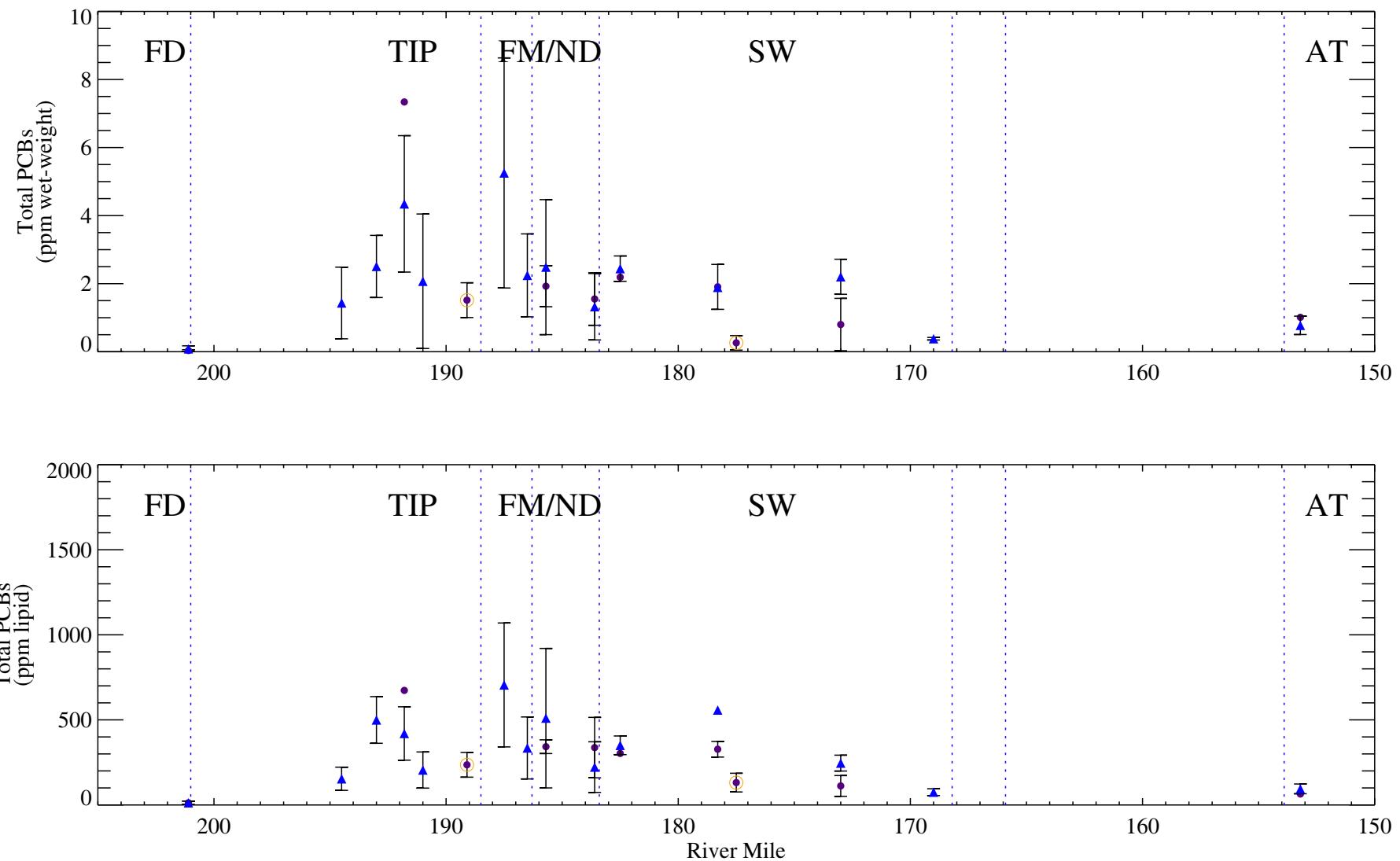


Figure 5-2. Spatial patterns in PCB concentrations in black bass.

Prep: fillet

Year: 2007.

Orange circles indicate historic sampling locations. Blue dotted lines indicate approximate dam locations.

Source: 2007 BMP (QEAExport_Fish 01/07/2008).

- largemouth bass
- ▲ smallmouth bass

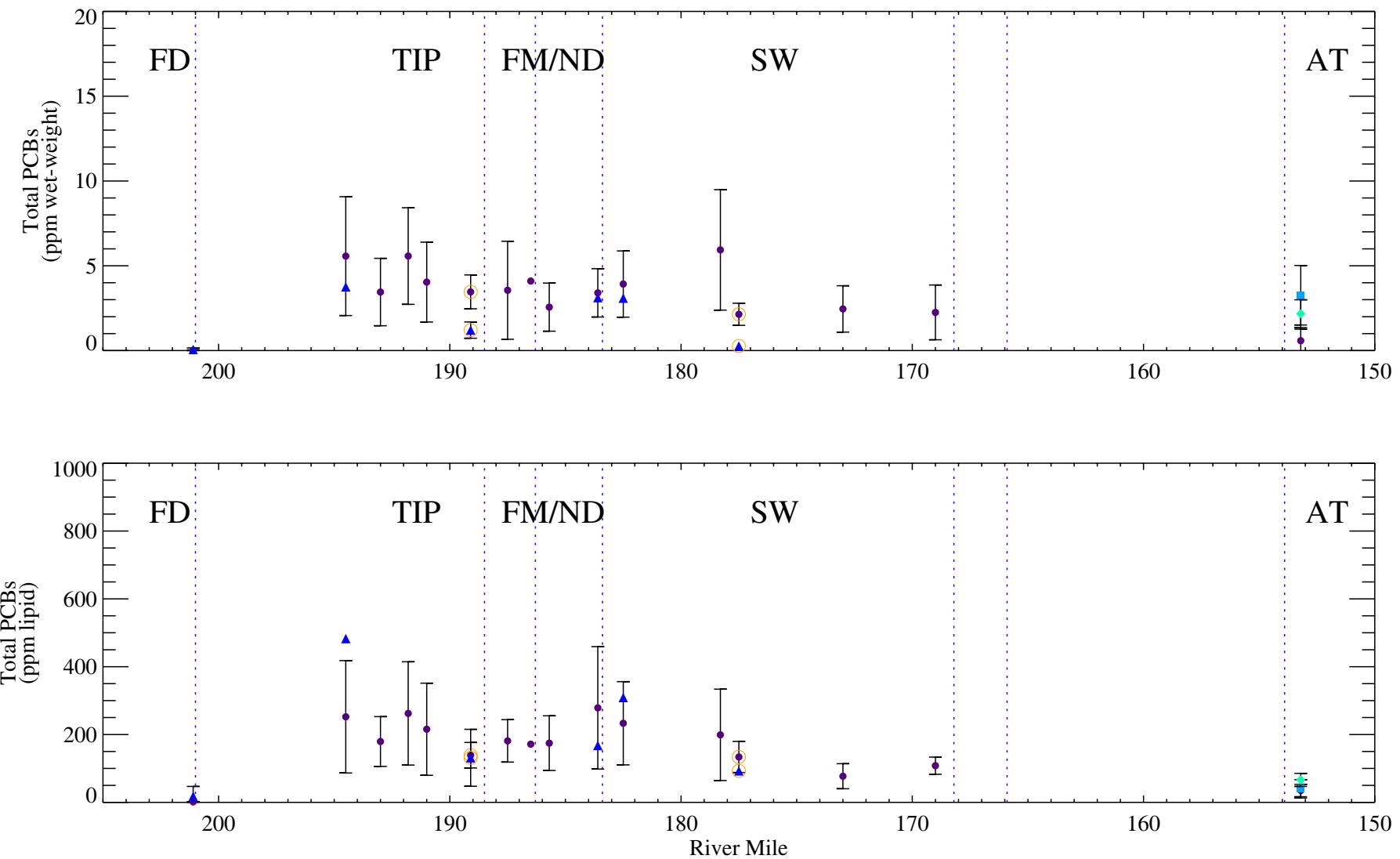


Figure 5-3. Spatial patterns in PCB concentrations in ictalurids.

Prep: fillet

Year: 2007.

Orange circles indicate historic sampling locations. Blue dotted lines indicate approximate dam locations.

Source: 2007 BMP (QEAEExport_Fish 01/07/2008).

- brown bullhead
- ▲ yellow bullhead
- channel catfish
- ◆ white catfish

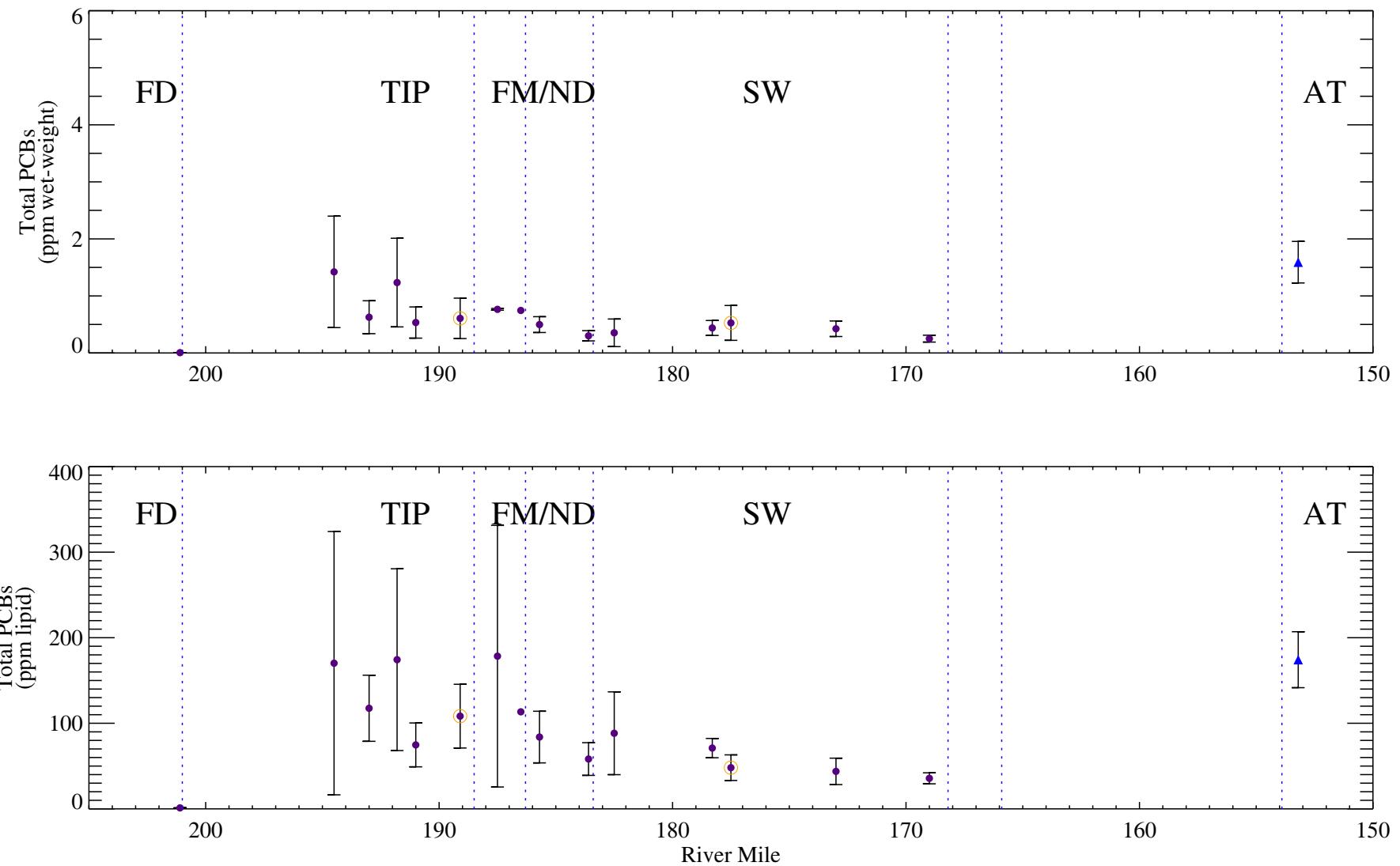


Figure 5-4. Spatial patterns in PCB concentrations in perch.

Prep: fillet

Year: 2007.

Orange circles indicate historic sampling locations. Blue dotted lines indicate approximate dam locations.

Source: 2007 BMP (QEAExport_Fish 01/07/2008).

- yellow perch
- ▲ white perch

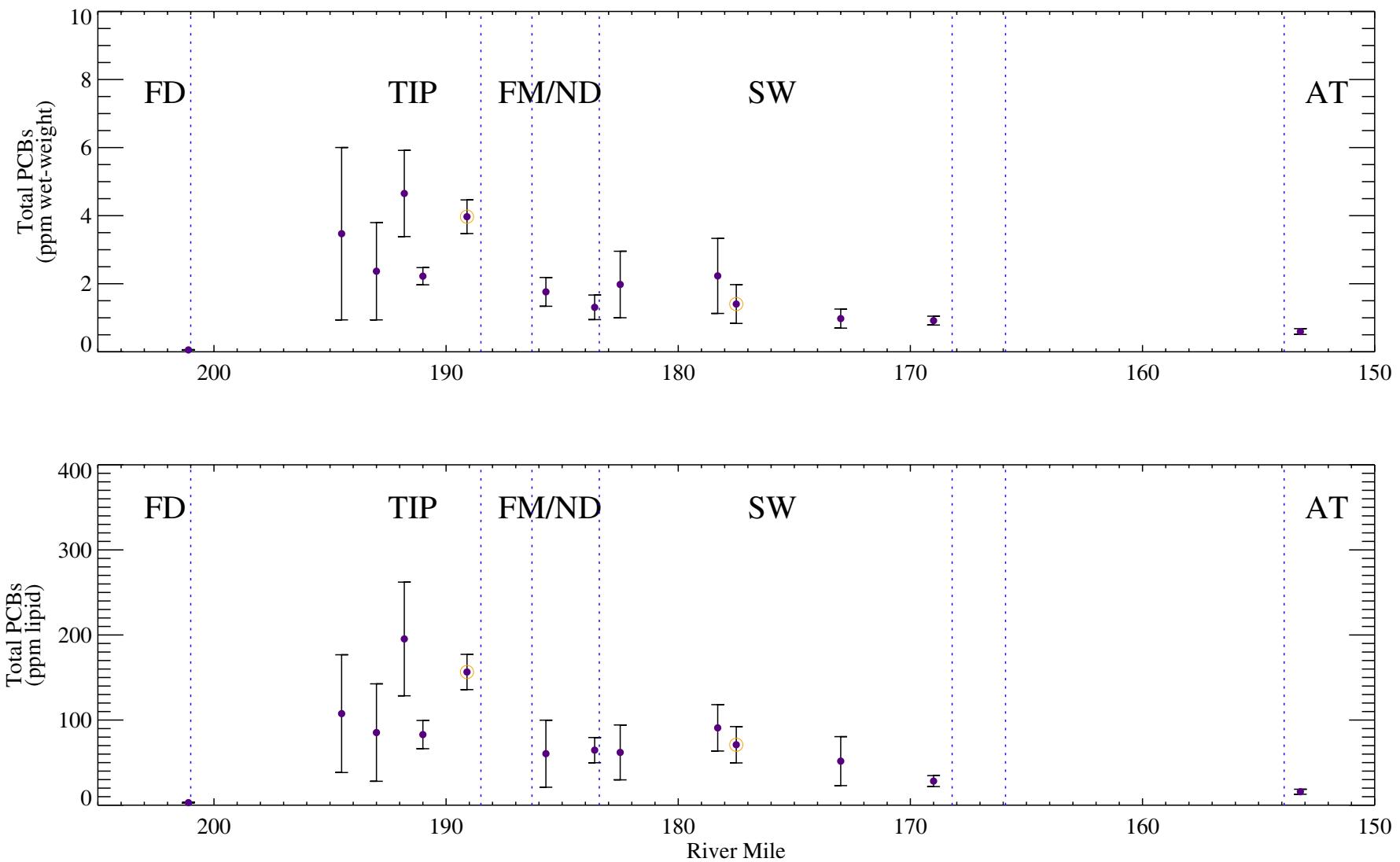


Figure 5-5. Spatial patterns in PCB concentrations in pumpkinseed.

Prep: whole body

Year: 2007.

Orange circles indicate historic sampling locations. Blue dotted lines indicate approximate dam locations.

Source: 2007 BMP (QEAExport_Fish 01/07/2008).

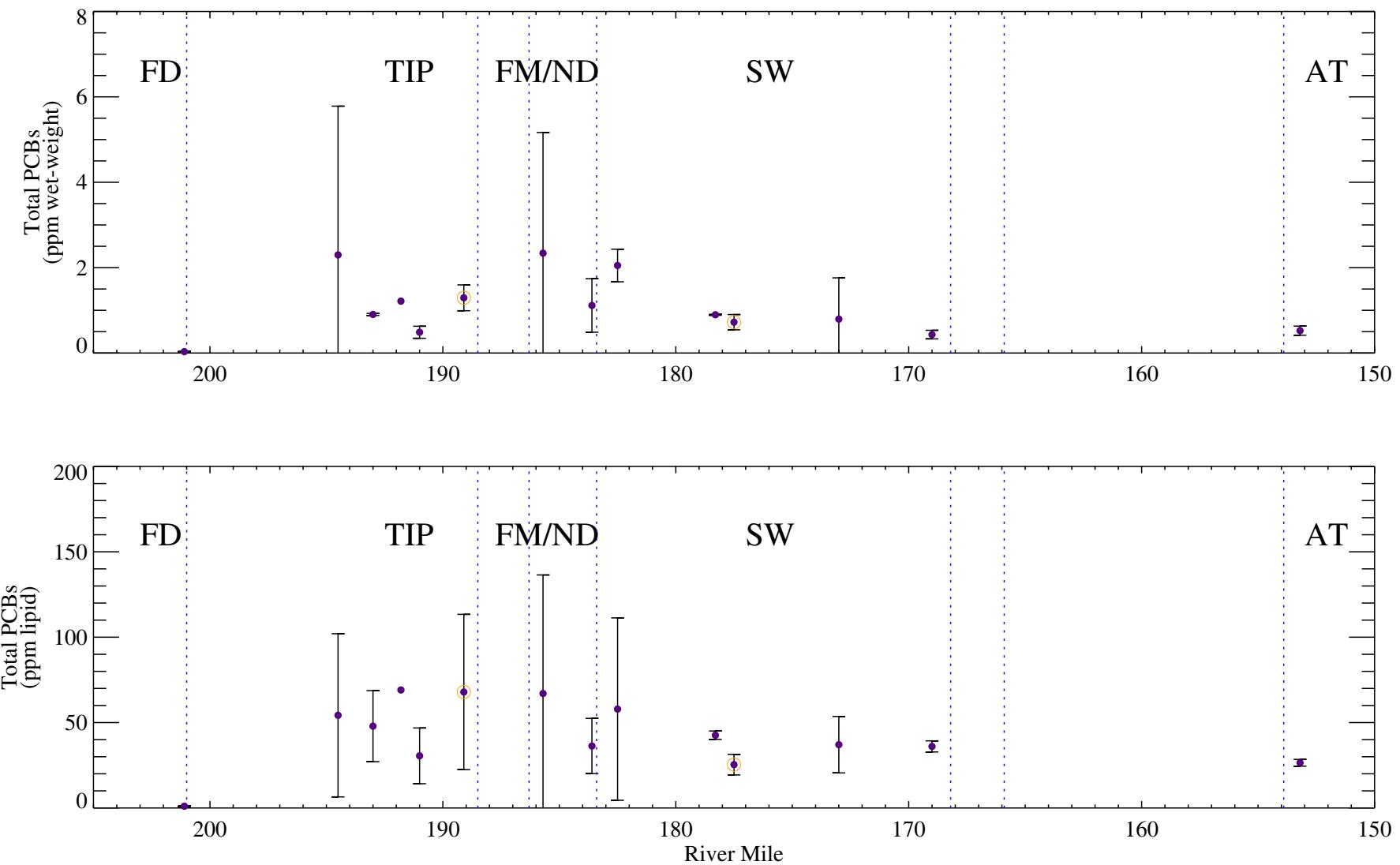


Figure 5-6. Spatial patterns in PCB concentrations in forage fish.

Prep: whole-body composite

Year: 2007.

Orange circles indicate historic sampling locations. Blue dotted lines indicate approximate dam locations.

Source: 2007 BMP (QEAExport_Fish 01/07/2008).

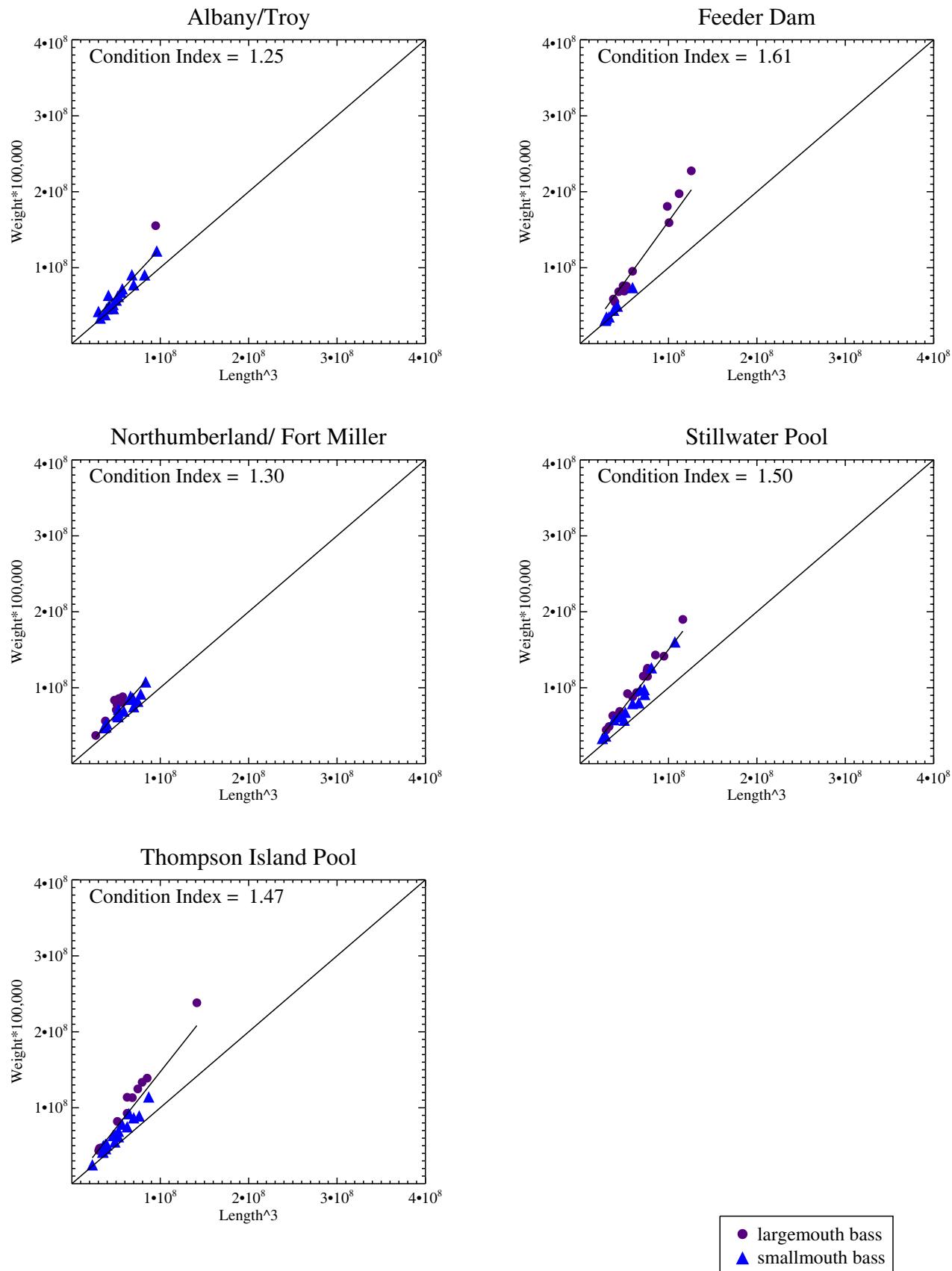


Figure 5-7. Condition index of black bass.

Spring and Autumn 2007 Sampling Events.
Source: BMP (QEAExport_Fish 01/07/2008).

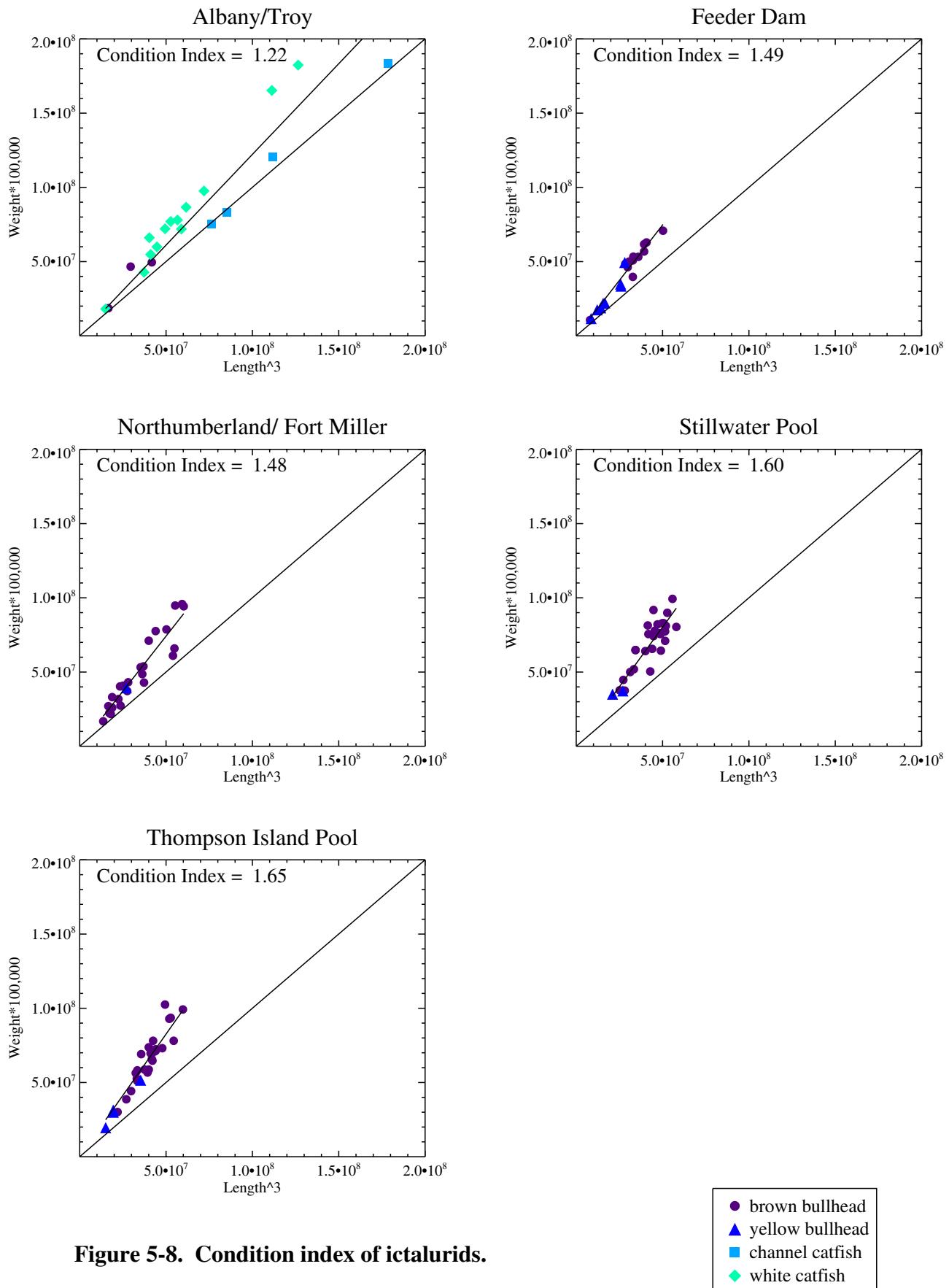


Figure 5-8. Condition index of ictalurids.

Spring and Autumn 2007 Sampling Events.
Source: BMP (QEAExport_Fish 01/07/2008).

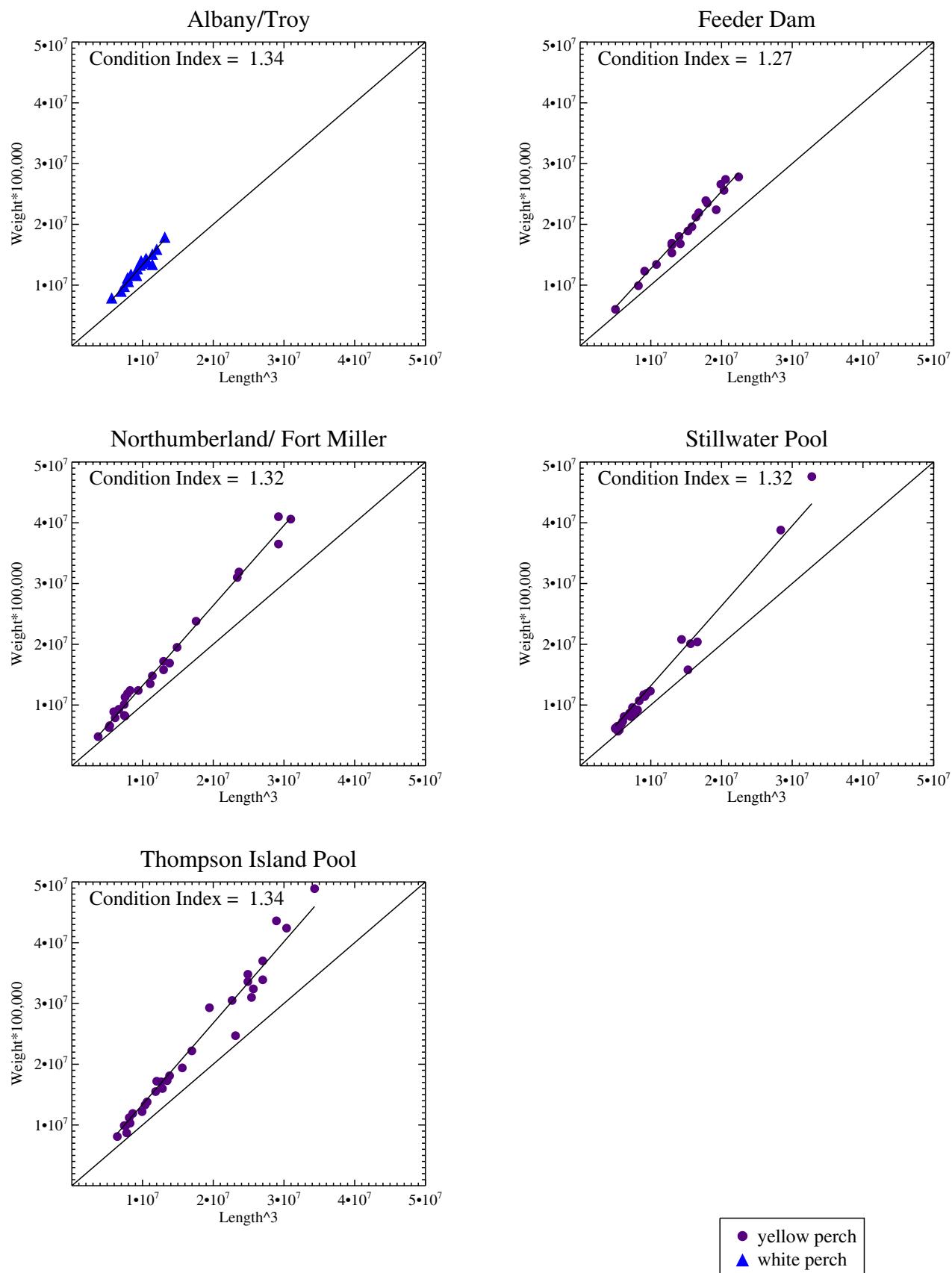


Figure 5-9. Condition index of perch.

Spring and Autumn 2007 Sampling Events.
Source: BMP (QEAExport_Fish 01/07/2008).

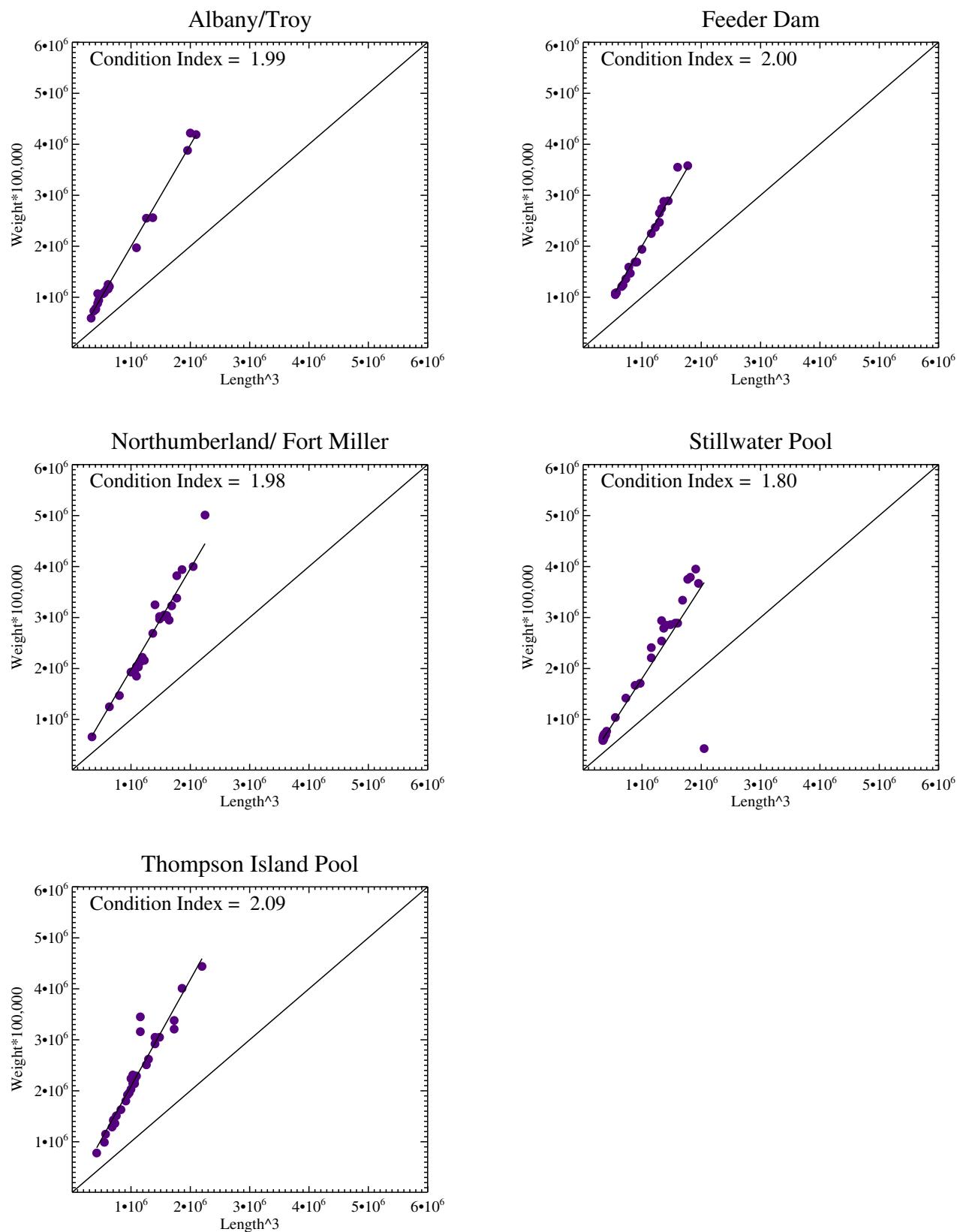


Figure 5-10. Condition index of pumpkinseed.

*Spring and Autumn 2007 Sampling Events.
Source: BMP (QEAExport_Fish 01/07/2008).*

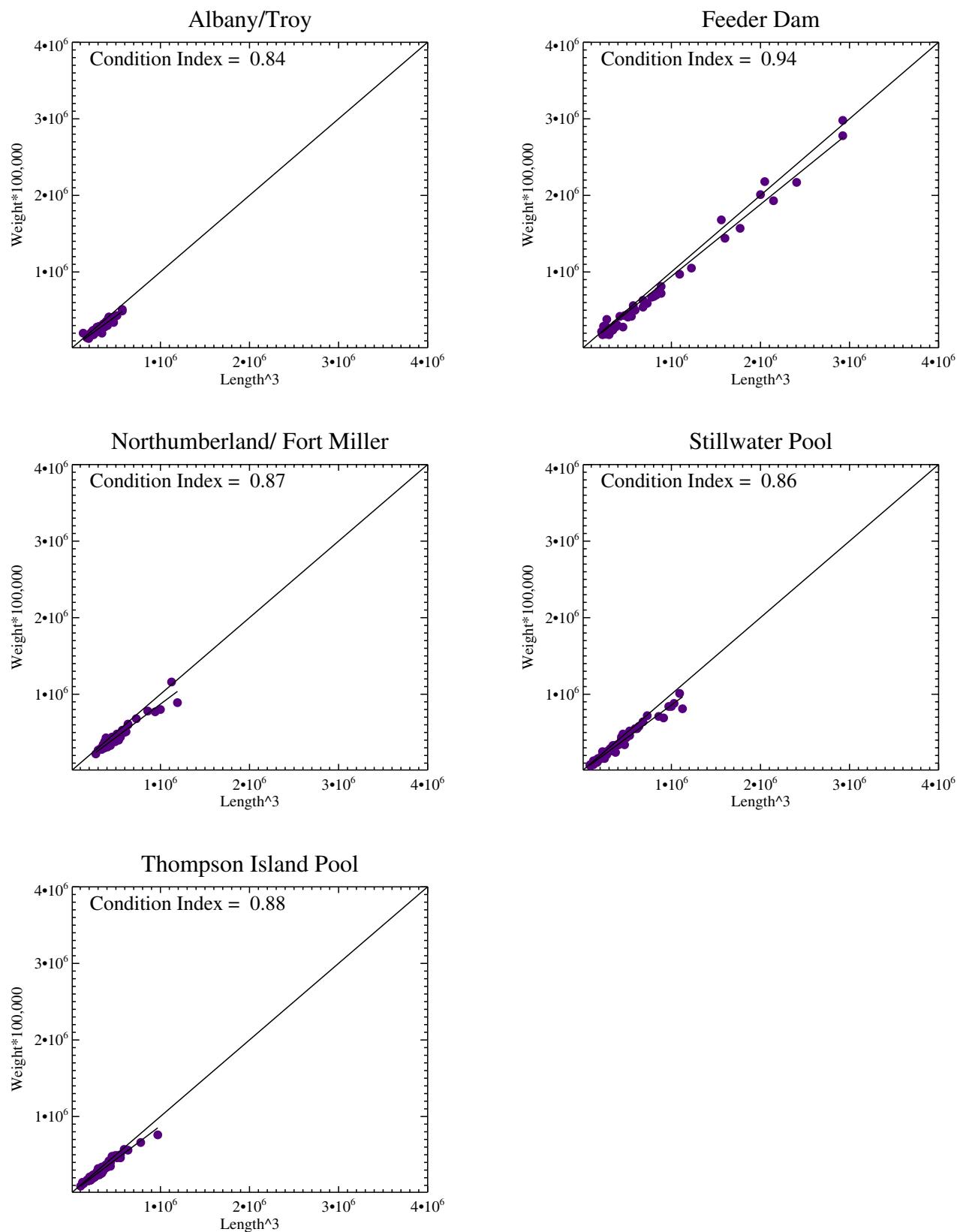


Figure 5-11. Condition index of forage fish.

*Spring and Autumn 2007 Sampling Events.
Source: BMP (QEAExport_Fish 01/07/2008).*

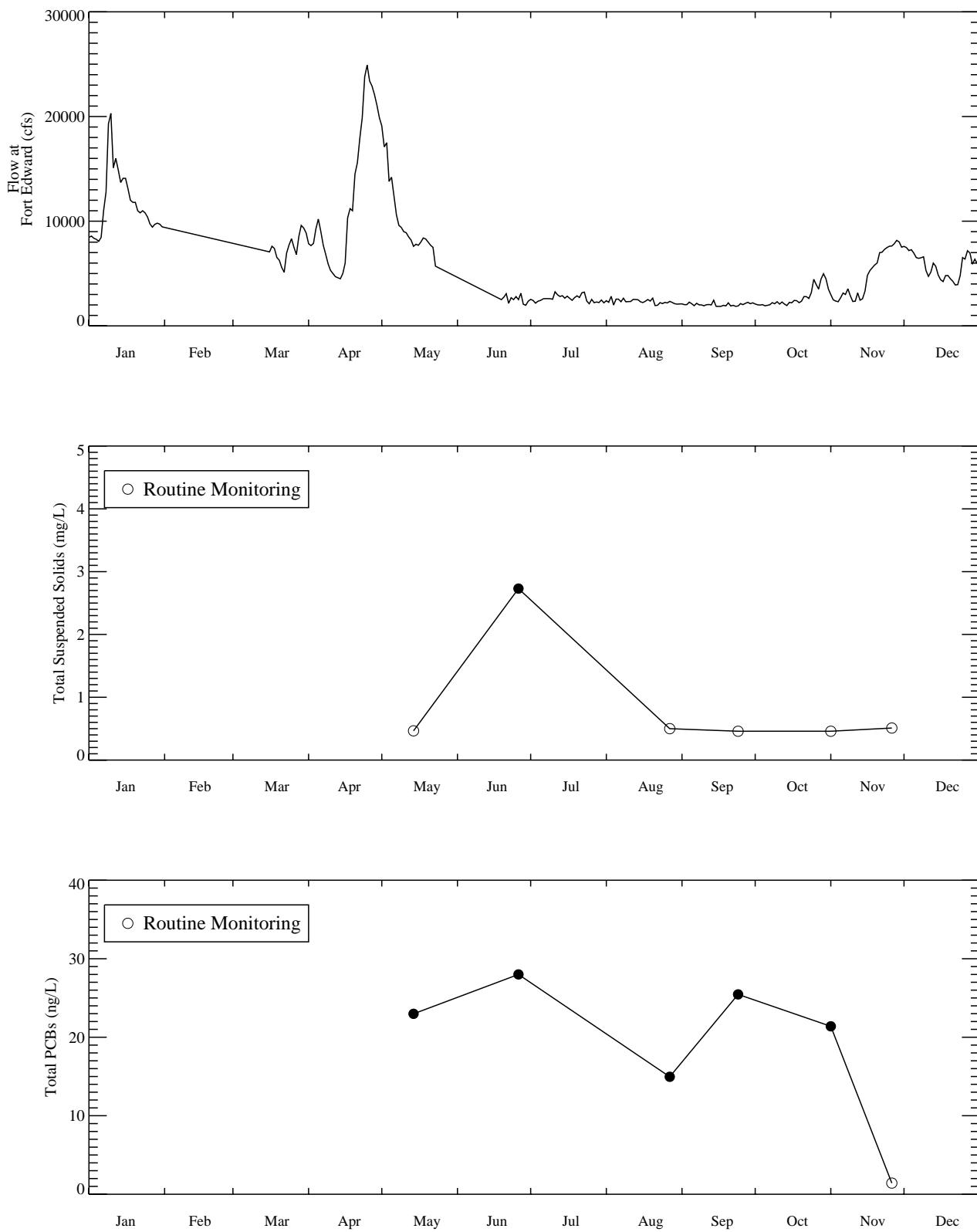


Figure 6-1. 2007 Temporal profiles of PCB and TSS results at TID-PRW2.

Non-detects plotted at half the detection limit with open symbols. Samples not plotted on the line are blind duplicates.

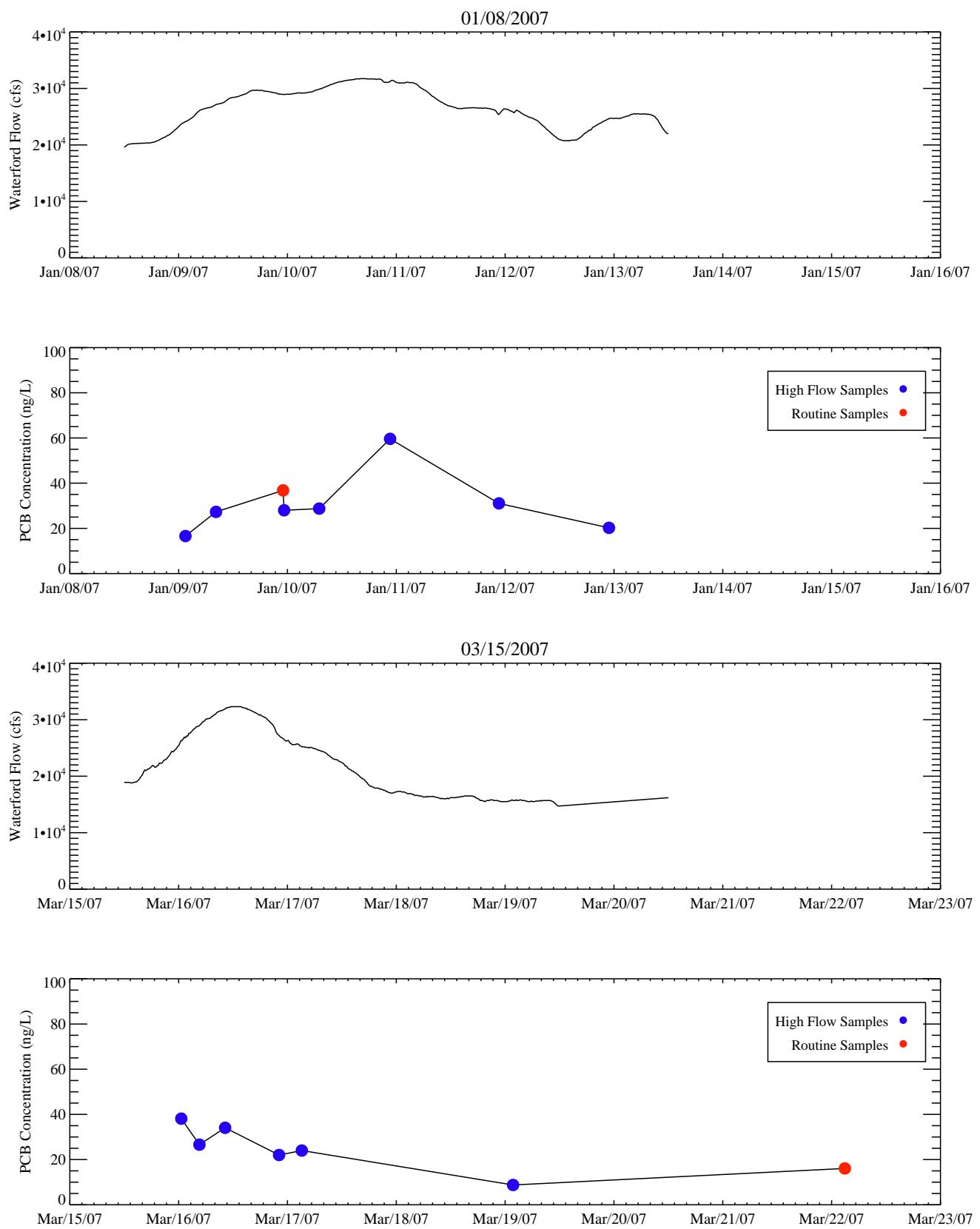


Figure 6-2. Waterford High Flow Sampling Events.

Notes:

- USGS 15 minute stage flow is provisional and subject to revision.
- Plots include high flow events with 6 or more sampling rounds.

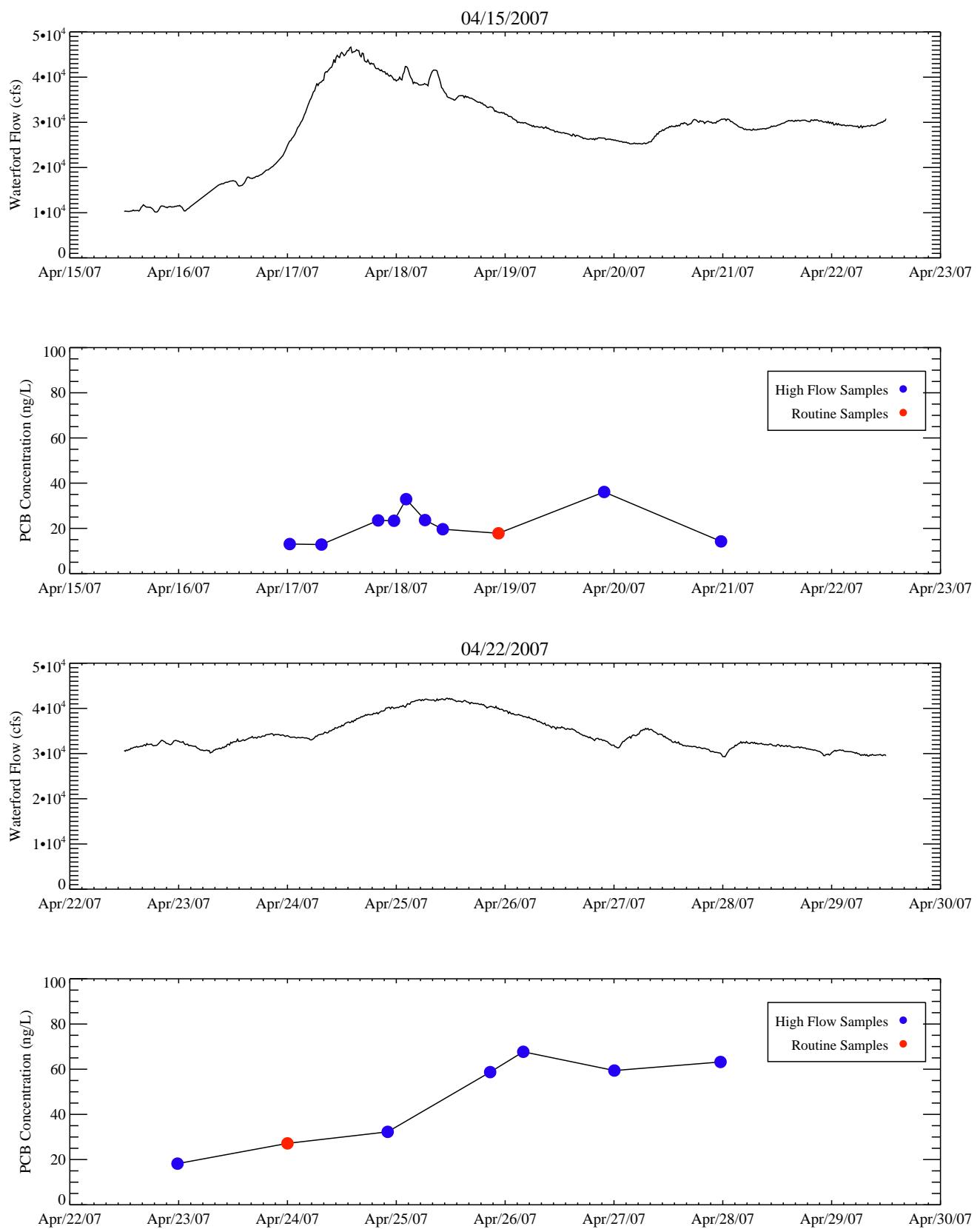
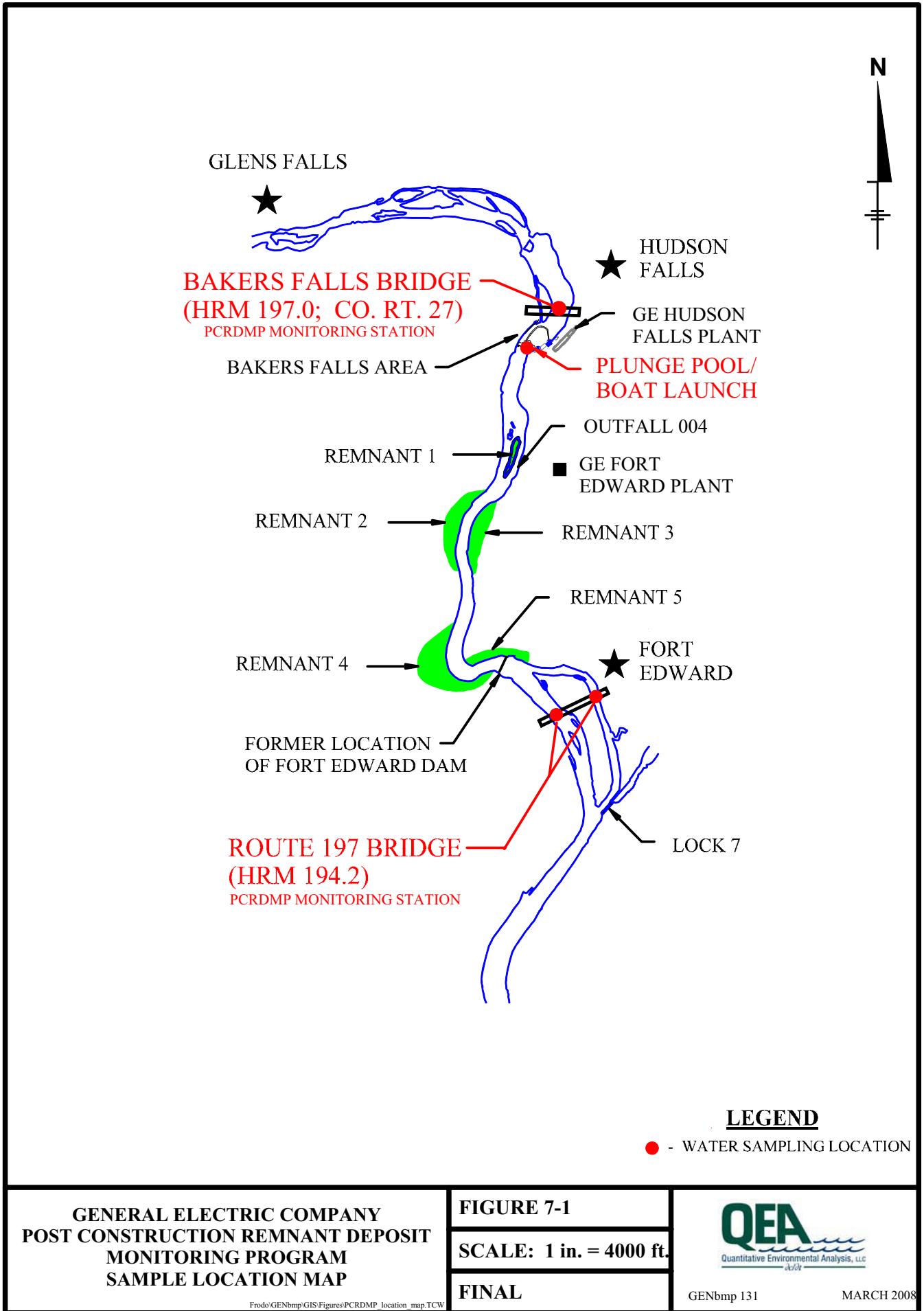


Figure 6-2. Waterford High Flow Sampling Events.

Notes:

- USGS 15 minute stage flow is provisional and subject to revision.
- Plots include high flow events with 6 or more sampling rounds.



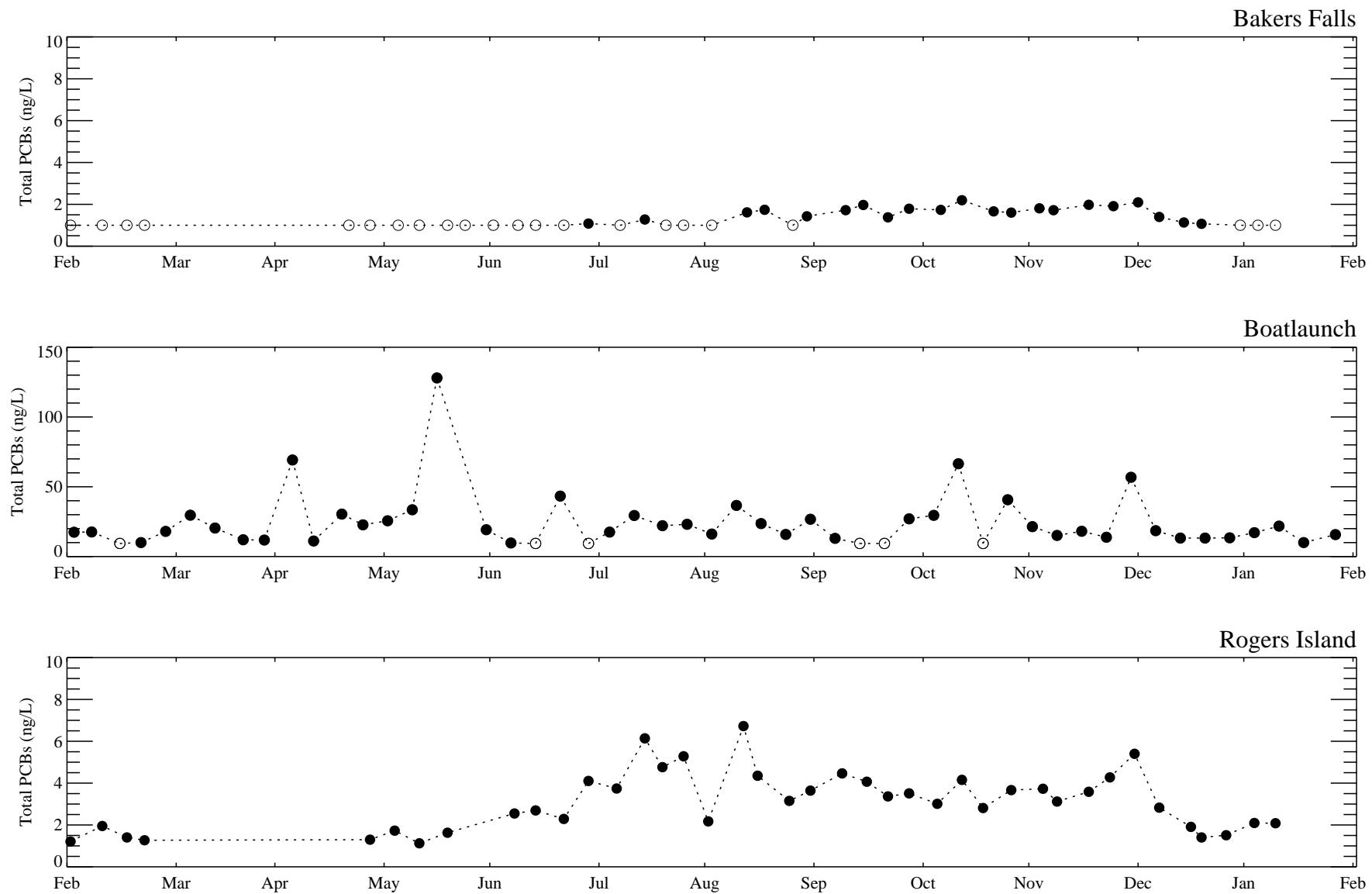


Figure 7-2. Temporal profiles of 2007 routine monitoring data collected in the vicinity of Hudson Falls.

Notes: Blind duplicate samples averaged. Non-detect total PCB samples set to the MDL (1.1 ng/L).

APPENDICES

**APPENDIX A
CORRECTIVE ACTION MEMORANDA
(CD-ROM ATTACHED)**



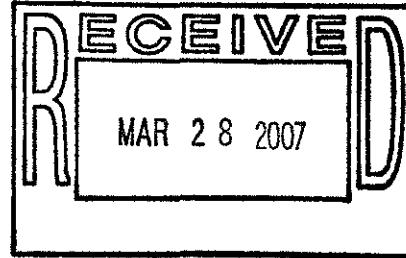
John G. Haggard
Manager, Hudson River Program

GE
319 Great Oaks Blvd
Albany, NY 12203

T 518 862 2739
F 518 862 2731
John.Haggard@ge.com

Via Federal Express

March 28, 2007



Team Leader, Hudson River Team
Emergency and Remedial Response Division
United States Environmental Protection Agency, Region 2
290 Broadway, 19th Floor
New York, New York 10007-1866
Attn: Douglas Garbarini, Hudson River PCBs Superfund Site (3 copies – 1 unbound)

Chief, New York/Caribbean Superfund Branch
Office of Regional Counsel
United States Environmental Protection Agency, Region 2
290 Broadway, 17th Floor
New York, New York 10007-1866
Attn: Hudson River PCBs Superfund Site Attorney (1 copy)

Director, Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7011
Attn: Hudson River PCBs Superfund Site (3 copies – 1 unbound)

Director, Bureau of Environmental Exposure Investigation
New York State Department of Health
547 River Street
Troy, New York 12180
Attn: Hudson River PCBs Superfund Site (2 copies)

***Re: Hudson River – Baseline Monitoring Program Quality Assurance Project Plan –
Corrective Action Memorandum No. 10***

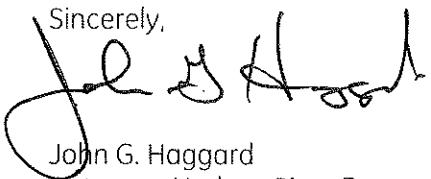
Dear Sir or Madam:

Attached please find Corrective Action Memorandum (CAM) No. 10 to the Hudson River Baseline Monitoring Program Quality Assurance Project Plan (BMP QAPP). This CAM has been developed to address a modification to the pumpkinseed fish sampling program following discussion with EPA oversight staff.

March 28, 2007
Page 2

Please contact Bob Gibson, Adam Ayers or me if you have any questions.

Sincerely,



John G. Haggard
Manager, Hudson River Program

JGH/bg
Enclosure

cc: Ben Conetta, EPA
Dave King, EPA
Adam Ayers, GE
Bob Gibson, GE
Margaret Murphy, QEA
David Blye, ESI

**GENERAL ELECTRIC COMPANY
HUDSON RIVER BASELINE MONITORING PROGRAM
CORRECTIVE ACTION MEMORANDUM #10**

Date: March 28, 2007

Organization Name: Quantitative Environmental Analysis, LLC

Initiator's Name and Title: Margaret H. Murphy

Problem Description:

During the Baseline Monitoring Program (BMP) yearling pumpkinseed sampling in the fall of 2004 and 2005, there was discussion with the EPA oversight representative (Ron Sloan, NYSDEC) regarding whether the larger pumpkinseeds within the size range approved in the QAPP (70-150 mm total length) were yearling fish. Based on visual observations in the field, QEA and NYSDEC personnel agreed that fish approaching the 150 mm limit could potentially belong to an older age class. Scale samples were collected from pumpkinseeds in 2004, 2005, and 2006 in accordance with the BMP QAPP, in the event that aging of fish is deemed appropriate. The ages of the pumpkinseeds collected in September 2004 as part of the BMP were estimated using scales. Analysis of these 2004 age data indicates that all of the pumpkinseed between 131 and 150 mm total length were comprised of two and three year old fish and 70% of fish between 70 and 130 mm total length were yearlings (Figure 1 and Table 1). While there is the expected overlap of yearling and 2 year old fish in the 101-130 mm total length range in 2004 (Table 1), individuals in this size range can experience temporal variability in age class distribution. Given this temporal variability in sizes of yearling pumpkinseed, particularly for fish between 131 and 150 mm total length, the reduction of the BMP yearling pumpkinseed targeted size range from 70-150 mm to 70-130 mm total length should be representative of a larger proportion of yearling fish each year. This targeted size range of 70-130 mm total length for BMP yearling pumpkinseeds was mutually agreed upon during field efforts in 2006.

Reported To: Adam Ayers, John Haggard, and Bob Gibson ,GE; John Connolly, QEA

Corrective Action:

BMP sampling for yearling pumpkinseeds will focus on individuals between 70 and 130 mm total length. While it is understood that it is not feasible to capture 100% yearling pumpkinseed, this size range should allow for a high probability of sampling the yearling pumpkinseed population.

Reviewed and Implemented By: Margaret H. Murphy (QEA)

cc: GE Program Manager: John Haggard; Bob Gibson

Field Program Manager: Mark LaRue (QEA)

Other Distribution: John Connolly (QEA), Mark LaRue (QEA), Adam Ayers (GE),
David Blye (ESI)

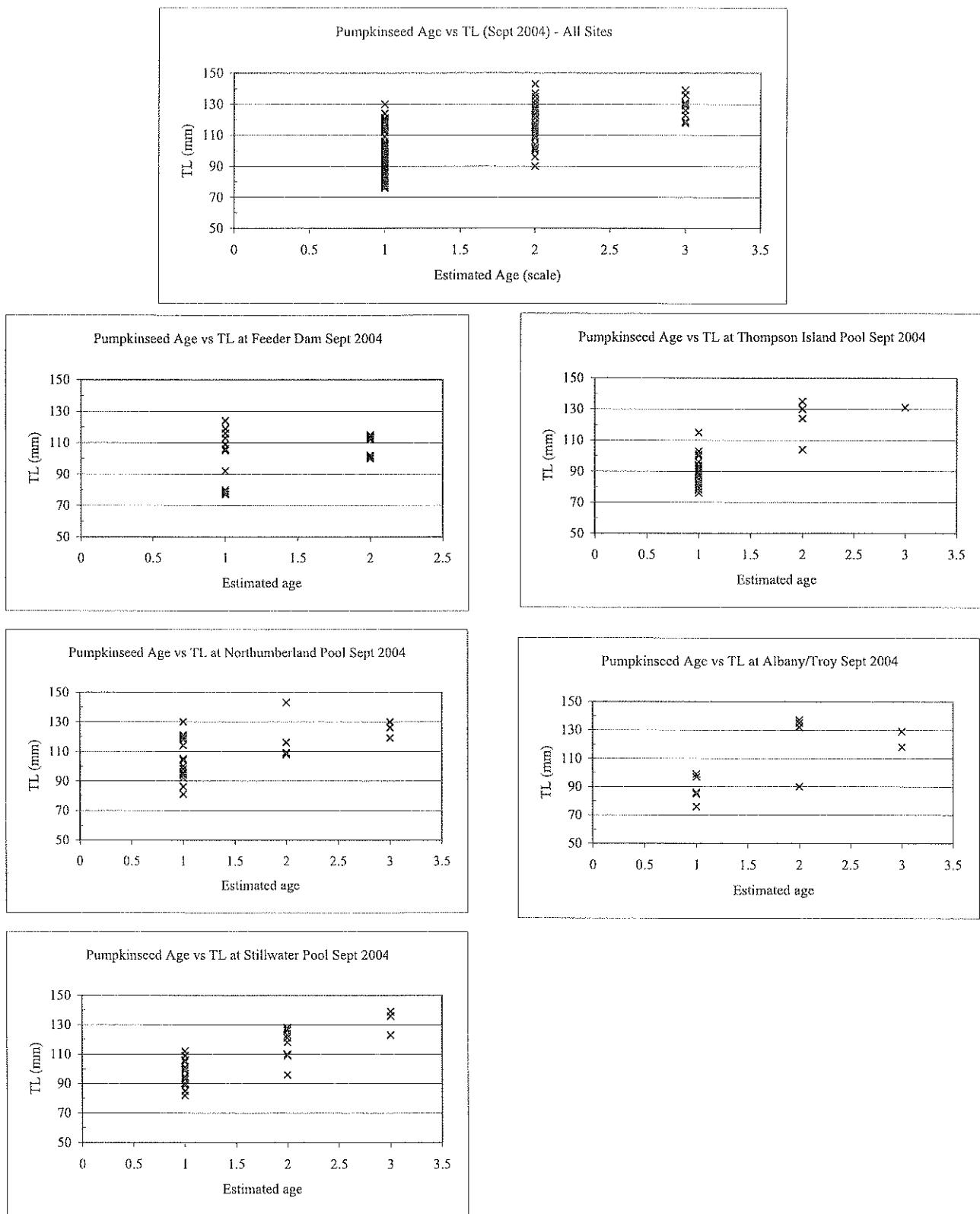


Figure 1. Pumpkinseed age versus total length from Hudson River BMP samples collected in September 2004.

Table 1. Proportion of pumpkinseed within each age and size range from samples collected in September 2004.

Count per Total Length	AGE			Total Count
	1	2	3	
70-130 mm	78	28	6	112
% per age	70%	25%	5%	
70-100 mm	52	3	0	55
% per age	95%	5%	0	
101-130 mm	26	25	6	57
% per age	46%	44%	11%	
131-150 mm	0	7	3	10
% per age	0	70%	30%	



**HUDSON RIVER PCBS SITE
BASELINE MONITORING PROGRAM
LABORATORY EVALUATION OF
NORTHEAST ANALYTICAL, INC.
SCHENECTADY, NEW YORK**

February 29, 2008

Prepared for:

GENERAL ELECTRIC COMPANY
320 Great Oaks Office Park
Albany, NY 12203

Prepared by:

ENVIRONMENTAL STANDARDS, INC.
1140 Valley Forge Road
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Introduction

On December 11, 2007, Environmental Standards, Inc. (Environmental Standards) auditors Ms. Meg A. Michell, M.S., and Mr. David R. Blye, CEAC (hereinafter referred to as the Audit Team) performed an on-site audit/evaluation of Northeast Analytical, Inc. (NEA) in Schenectady, New York, in association with the Hudson River PCBs Site Baseline Monitoring Program (BMP). This audit was performed to meet the requirements detailed in Section C.1.2.3, "External Laboratory System Audits," of the approved Quality Assurance Project Plan for the Hudson River PCBs Site, Baseline Monitoring Program (BMP) Plan, Revision 2, dated May 28, 2004 (BMP QAPP). This audit was also conducted to provide feedback on laboratory operating issues relative to method compliance, laboratory systems, and good laboratory practices. The findings of the audit follow.

NEA was founded in 1989 as a private company, owned and operated by Mr. Robert Wagner and Mr. Robert Stoll. The laboratory was originally established to provide analyses of environmental samples for polychlorinated biphenyls to support General Electric Company (GE). In 1990, the laboratory added analyses for metals, volatile organics, and toxicity leaching characteristic procedures (TCLP) to its analytical capabilities. In June 1999, the laboratory moved from its original facility into a new laboratory facility. NEA currently employs approximately 33 technical and support personnel and staffs one shift from 0800 to 1700 hours, Monday through Friday; however, the laboratory has the flexibility to staff split-shifts to handle high volumes on an as-needed basis. NEA continues to specialize in the analysis for PCBs (both Total PCBs as Aroclors and congeners) and derives the majority of its revenue from PCB analyses.

The NEA laboratory facility is a single-story building that occupies a total area of approximately 22,000 square feet of space. The facility is sub-divided to facilitate segregation of trace-level and high-level PCB samples to minimize potential cross-contamination of the low-level samples. The facility is protected from intruders by a lock and keypad access system, and each laboratory employee is assigned a unique entry code. The facility was well organized and extremely neat and clean during the audit.

Specific to the BMP, NEA performs analysis of fish tissue and water associated with the fish and water column monitoring programs. The analyses conducted by NEA for fish tissue are listed below.

- Lipids by the SOP for the Extraction of Lipids from Fish and Biota Material (NE158_03) included as Appendix 24 of the BMP QAPP.
- Total PCBs by the SOP for PCBs by SW-846 Method 8082 (NE148_04) included as Appendix 25 of the BMP QAPP.
- Modified Green Bay Method (mGBM) Congener PCB analysis by the SOP for the Analysis of PCB Congeners by NEA013_07 included as Appendix 26 of the BMP QAPP.

The analyses conducted by NEA for the water column monitoring are listed below.

- mGBM Congener PCB analysis by the SOP for the Congener-Specific PCB Analysis (Low Level Calibration Method) (NE207_03) included as Appendix 26 of the BMP QAPP.
- Wet chemistry data generated for total suspended solids (TSS) by US EPA Method 160.2, dissolved organic carbon (DOC) by US EPA Method 415.1, and particulate organic carbon

(POC) by Standard Method 5310B as included in Appendices 18 and 19 (DOC and POC) of the BMP QAPP.

NEA has several full-time PCB analysts and extraction personnel trained in performing the program-specific extractions and analyses. The Laboratory Director, Mr. Robert Wagner, has considerable experience in interpretation of PCB chromatography of Hudson River matrices and is responsible for final qualitative PCB identification. NEA has eight Horizon SPE_DEX 4790 automated solid phase extraction systems to support the water column monitoring program, which requires extraction of either 8-liter and 1-liter aqueous sample volumes. The laboratory has several gas chromatographs (GCs) equipped with ECD detectors and 30-m DB-1 columns dedicated to the GE project. One GC/ECD instrument is set up to conduct the mGBM PCB congener fish analysis and a second GC/ECD instrument is set up to conduct the mGBM PCB congener water analysis. Based on discussions with management, the laboratory personnel are aware of BMP-specific requirements. A copy of the BMP QAPP is readily available to laboratory personnel to review and verify project requirements.

By the very nature of an audit, some critical statements, which should not be regarded as an overall indication of the laboratory's qualifications, are presented in this report; instead, these statements should be considered representations of areas for laboratory operational improvement. This audit has been prepared in support of the BMP QAPP.

Audit Findings

During the on-site audit of NEA, brief interviews were conducted with the analysts and section managers to enable the Audit Team to gain an insight of the overall practices at NEA operations, to assess the laboratory personnel's understanding of quality assurance, and to evaluate NEA personnel's understanding of the requirements stipulated in the BMP QAPP. This audit report was based upon these interviews and an examination of the relevant areas of laboratory operations. The following sections provide the findings of the audit/evaluation. Findings are presented and may be followed by a recommendation, suggestion, or comment (as defined below).

Recommendation – Action required based on method, SOP, contract, or best practice.

Suggestion – No action required, but considered good laboratory practice.

Comment – No action required; information provided for use by the laboratory or GE.

Very few issues were identified at NEA with respect to adhering to the project-specific SOPs or quality assurance. A summary of the issues identified during the December 11, 2007, audit follows.

Bottleware and Preservation

2007 Audit Finding: NEA purchases pre-cleaned bottleware from multiple vendors. The laboratory does not reuse bottles. According to laboratory personnel, the suppliers provide certificates of analysis to document the cleanliness of the pre-certified-clean glassware for volatile analysis; however, certificates of analysis are not provided for other glassware.

Recommendation: All sample vessels and media should be virgin, pre-cleaned, and certified clean (each requested target compound less than the required detection limit). Bottles must be certified for all standard analytical parameters for which the bottle type is designated for collection, and documentation as to the integrity of the bottleware must be maintained at the laboratory. The laboratory could institute a process to check the bottleware for which

certificates of analysis are not provided by the vendor by analyzing several randomly selected bottle blanks from each new lot. If this lot blank testing is conducted, these analysis records should be maintained to document bottle cleanliness.

Sample Preparation, Concentration, and Cleanups

2007 Audit Finding: Sample preparation information is recorded in an electronic logsheet in the laboratory information management system (LIMS) at computer terminals located in each sample preparation area. Whenever direct entry into the electronic logsheet is inconvenient because a computer terminal is not located adjacent to where the work is being performed, hand-written notes are made and subsequently entered into LIMS and discarded (e.g., the sample volumes recorded for aqueous samples may be initially written on a post-it note that is not maintained once transcribed into LIMS). Upon completion, each logsheet is printed and placed into the project folder.

Recommendation: When a computer terminal is not convenient for recording information at the time that it is obtained, a formal system of manual documentation should be used and documentation should be maintained after completion of LIMS entry. This system will ensure that entry or transcription errors do not occur when the information is entered into the electronic worksheets.

2007 Audit Finding: The majority of the solvents, acids, and reagents in the sample preparation areas were properly labeled with the date opened with one exception in each of the organic preparation areas.

Recommendations: All acids and solvents should be labeled with the date received and the date opened.

2007 Audit Finding: A few errors were noted in the logbooks for the preparation of reagent, surrogate, matrix spiking, and calibration standard solutions. In one case, an obvious error in the expiration date of a spike standard was noted in the logbook (i.e., an expiration date of 5/5/07 was written in the logbook and was incorrect based on the date of preparation. The correct expiration date of 5/5/08 was written on the spike standard label.). In addition, in another case, the parent lot number was not recorded in the logbook (the field was present but blank) for the Florisil used for cleanup in the high-level organic preparation area.

Recommendation: The quarterly review of the standard preparation logbooks should be used to look for the types of errors noted above. Review of the logbook containing the Florisil preparation error had not been completed.

2007 Audit Finding: The logbook for the refrigerator containing the surrogate and spike solutions used during extraction indicated that temperatures above the criterion of 6°C were observed several consecutive days without comment.

Recommendation: When refrigerator temperatures are recorded that are above the temperature criterion, appropriate corrective action or commentary should be documented in the logbook.

Sample Analysis

2007 Audit Finding: The lot number for a solvent bottle used for sample dilution kept in the fume hood in the extractable analysis area was not legible (the number had been written directly on the bottle with marker and been wiped off during use).

Recommendation: A label should be used to record the lot number on all solvent bottles; marker can be wiped off more easily when directly placed on glass.

Audit Debrief

The findings of the audit were presented and summarized by the Audit Team to NEA personnel at the conclusion of the day so that corrective action could be initiated by NEA.

Audit performed by:



Meg A. Michell, M.S.
Senior Quality Assurance Chemist

Audit performed and report approved by:



David R. Blye, CEAC
Quality Assurance Specialist/
Principal

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Date: 2/29/08



**HUDSON RIVER PCB SITE
BASELINE MONITORING PROGRAM
LABORATORY EVALUATION OF
TESTAMERICA, INC.
PITTSBURGH, PENNSYLVANIA**

February 29, 2008

Prepared for:

GENERAL ELECTRIC COMPANY
320 Great Oaks Office Park
Albany, NY 12203

Prepared by:

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Introduction

On November 7, 2007, Environmental Standards, Inc. (Environmental Standards) auditors Mr. David R. Blye, CEAC; Mr. Stephen T. Zeiner, CEAC; and Ms. Erin E. Bailey (hereafter referred to as the "Audit Team") conducted an on-site audit/evaluation of the TestAmerica, Inc. (TestAmerica) Pittsburgh, Pennsylvania, facility on behalf of General Electric Company (GE) in association with the Hudson River PCBs Site Baseline Monitoring Program. This audit was performed to meet the requirements detailed in Section C.1.2.3 "External Laboratory System Audits" of the approved Quality Assurance Project Plan for the Hudson River PCBs Site, Baseline Monitoring Program (BMP) Plan, Revision 2, dated May 28, 2004. This audit was also conducted to provide feedback on laboratory operating issues relative to method compliance, laboratory systems, and good laboratory practices. The findings of the audit are presented in this report.

Prior to 2004, TestAmerica consisted of a number of networked laboratories predominantly on the East Coast and in the Midwest. On November 5, 2004, the Sequoia Analytical network of laboratories merged with TestAmerica. On January 2007, the entire Severn Trent Laboratories (STL) network merged with TestAmerica, collectively under the ownership of HIG Capital Investments of Boston, Massachusetts. The merger of the Sequoia, STL, and TestAmerica networks produced the largest environmental laboratory network in the United States. The Pittsburgh facility had been part of the STL network.

TestAmerica currently employs approximately 74 laboratory and support personnel and occupies a 34,000-square foot single-story facility in Pittsburgh, Pennsylvania. The facility's heating and air conditioning system was engineered to reduce the possibility of contamination among the laboratory areas. The facility is accessed by employees through use of limited access key cards. The laboratory is protected through an integrated smoke/fire/burglar/sprinkler system that is monitored by a security system center.

The facility was found to be well designed, spacious, clean, and well kept. TestAmerica's business hours are 0800 to 1700 hours, Monday through Friday, with Saturday hours (for sample receipt) from 0800 to 1700 hours.

Specific to the BMP, TestAmerica performs analysis for Total and Dissolved Target Analyte List (TAL) Metals; laboratory-specific Standard Operating Procedures (SOPs) are used for mercury analysis by US EPA Method 245.1 and metals analysis by ICP/MS (US EPA Method 200.8). Based on discussions with management, the laboratory personnel are aware of BMP-specific requirements, including digestion of field-filtered aqueous samples for dissolved metals and BMP-specific reporting limits for cadmium. In addition, the laboratory reports results down to the Method Detection Limit (MDL) as required by the BMP QAPP. Finally, results reported between the reporting limit and MDL are qualified as estimates ("J") by the laboratory.

By the very nature of an audit, some critical statements, which should not be regarded as an overall indication of the laboratory's qualifications, are presented in this report; instead, these statements should be considered representations of areas for laboratory operational improvement. This audit report has been prepared in support of the BMP QAPP.

Audit Findings

During the on-site audit of TestAmerica, brief interviews were conducted with the analysts and section managers to enable the Audit Team to gain an insight of the overall practices of TestAmerica operations, to assess the laboratory personnel's understanding of QA, and to evaluate TestAmerica personnel's understanding of the requirements stipulated in the Quality Assurance Project Plan for the Hudson River PCBs Site, Baseline Monitoring Program, May 28, 2004, Revision 2 (BMP QAPP). This audit report was based upon these interviews and an examination of the relevant areas of laboratory operations. The following sections provide the findings of the audit/evaluation. Comments will be made and may be followed with recommendations and/or suggestions. Action required by the laboratory based on a recommendation, suggestion, or comment (as defined below) is presented in this report.

Recommendation – Action required based on method, SOP, contract, or best practice.

Suggestion – No action required, but considered good laboratory practice.

Comment – No action required; information provided for use by the laboratory or GE.

Very few issues were identified at TestAmerica with respect to adhering to the project-specific SOPs or quality assurance contained in the BMP QAPP. A summary of the issues identified during the November 7, 2007, audit follows.

Sample Receipt and Storage

2007 Audit Finding:

The Audit Team observed that the Sample Custodian does not correctly enter the parent reagent information into the electronic reagents logbook for preservative solutions. In addition, the information entered into the electronic reagent logbook is not peer reviewed for accuracy.

Recommendations: TestAmerica Pittsburgh should retrain the Sample Custodian on the electronic reagents logbook entry procedures. In addition, TestAmerica should establish a documented peer review system for the information entered into the electronic reagents logbook.

Bottleware and Preservation

2007 Audit Finding:

The Audit Team observed that the bottleware order forms include custody information. The bottleware preparation personnel stated that the copy of the bottle order that accompanies the bottleware to the field is not typically signed by TestAmerica personnel.

Recommendation: The bottleware preparation technician should sign and date the bottleware order that accompanies the bottleware to the field to document custody.

2007 Audit Finding:

According to bottleware preparation personnel, outgoing sample coolers with empty bottles/vessels shipped to TestAmerica's clients are not typically custody-sealed prior to leaving the TestAmerica facility.

Recommendation: TestAmerica should custody-seal all bottleware shipped to the field.

Preparation and Analysis by US EPA Method 245.1 for Mercury

No findings relative to preparation and analysis of BMP sample for mercury were identified.

Metals Preparation and Analysis by US EPA Method 200.8

2007 Audit Finding:

The majority of the reagents (e.g., H₂SO₄ used for mercury digestions) evaluated were observed to have been labeled with the date received and the date opened. The Audit Team observed squeeze bottles of acid solutions in the metals preparation area that were not properly labeled to allow traceability. The metals preparation personnel indicated that the squeeze bottles are not used as part of the sample preparation and were not sure of the origin of the squeeze bottles.

Recommendation: TestAmerica should train all analysts to label reagent containers with appropriate information to allow for traceability of reagents. The analyst should also be reminded that reagents should remain within the appropriate area of the laboratory.

2007 Audit Finding:

Metals preparation personnel stated that the certificates of accuracy and cleanliness are not maintained for the hot block digestion tubes. The Audit Team evaluated the current certificates for the current digestion tubes. The certificate limits of cleanliness were above the TestAmerica Pittsburgh reporting limits for the ICP/MS analysis for several analytes.

Recommendations: TestAmerica must maintain either electronic or hard copies of the accuracy and cleanliness for the digestion tubes. TestAmerica should either identify a new vendor or perform digestion tube lot cleanliness checks.

2007 Audit Finding:

The metals preparation analyst indicated that optima reagents (ultra pure) are used for the ICP/MS sample preparations due to detection limits required. The metals digestion SOPs PT-IP-0002 and PT-IP-0003 do not reflect the use of optima reagents (ultra pure) for the ICP/MS sample preparations.

Recommendation: TestAmerica should revise SOPs PT-IP-0002 and PT-IP-0003 to reflect the procedures being utilized in the laboratory.

2007 Audit Finding:

Based on a discussion with the metals preparation analyst, the temperatures obtained from the digestion blocks during sample digestion are recorded in the metals digestion logbook; however, metals preparation personnel stated that the thermometer correction factor is not used when recording the hot block temperature.

Recommendation: TestAmerica should train the metals preparation analysts to utilize the thermometer correction factor when reporting temperatures.

2007 Audit Finding:

The instrument maintenance logbooks evaluated appeared to be completed; however, documented peer review had not been performed.

Recommendation: The instrument maintenance logbooks must undergo periodic documented peer review.

2007 Audit Finding:

The Audit Team observed that the auto-pipettes had not been calibrated quarterly; the last calibration was in April 2007 (7 months prior to the audit date).

Recommendation: TestAmerica should develop a reminder or check system to ensure that the calibration frequency is met for auto-pipettes.

2007 Audit Finding:

The Audit Team observed that the ICP/MS analysts do not document the lot number of the internal standard solution on the instrument sequence.

Recommendation: TestAmerica should document the lot number of the internal standard solution on the instrument sequence to maintain complete traceability of all reagents and standards associated with the sample analyses.

Audit Debrief

The findings of the audit were presented to TestAmerica personnel by the Audit Team at the conclusion of the day or in subsequent conversations so that TestAmerica could initiate corrective action.

Audit performed by:

Erin E. Bailey
Quality Assurance Chemist

Audit performed by:

Stephen T. Zeiner, CEAC
Senior Quality Assurance Chemist

Audit performed and report approved by:

David R. Blye, CEAC
Quality Assurance Specialist/
Principal

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Date: 2/29/08



Setting the Standards for Innovative Environmental Solutions

**FIELD AUDIT REPORT FOR WATER COLUMN SAMPLING ACTIVITIES
ON AUGUST 30, 2007
FOR THE HUDSON RIVER PCBs SITE**

Baseline Monitoring Program

November 2, 2007

Prepared for:

General Electric Company
Corporate Environmental Programs
Albany, NY

Prepared by:

Environmental Standards, Inc.
1140 Valley Forge Road
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Attachment

Attachment 1: Field Audit Checklist

1.0 Introduction

In February 2002, the United States Environmental Protection Agency (US EPA) issued a Record of Decision (ROD) for the Hudson River PCBs Site (US EPA, 2002). The selected remedy includes dredging of approximately 2.65 million cubic yards of PCB-containing sediments. The US EPA ROD divided the Upper Hudson River into the following three sections.

- Section 1 – Former Location of Fort Edward Dam to Thompson Island Dam (approximately 6.3 miles).
- Section 2 – Thompson Island Dam to Northumberland Dam (approximately 5.1 miles).
- Section 3 – Northumberland Dam to the Federal Dam in Troy (approximately 29.5 miles).

The ROD specifies that a Baseline Monitoring Program (BMP) be conducted to establish baseline river conditions to allow for an evaluation of changes in those conditions that result from implementation of the selected remedy and verification that the remedy ultimately succeeds in achieving the remedial action objectives established in the ROD. The purpose of the current field sampling project is to collect water column information necessary to characterize the PCB concentrations at representative Upper Hudson River locations prior to dredging.

General Electric Company (GE) and its consultants developed the “Quality Assurance Project Plan for the Hudson River Baseline Monitoring Program” (QAPP, May 2004, Revision 2) for use as the main project control document for water column sampling. The QAPP includes standard operating procedures (SOPs) that provide specific procedures for tasks such as collection of the water column samples and measurement of water quality parameters.

GE has retained Environmental Standards, Inc. (Environmental Standards) to conduct audits of field activities and to perform other QA/QC functions associated with the BMP. The field audits are intended to provide GE with an indication of the quality of field services provided by the field contractors as part of the BMP and to ensure that the field contractors are adhering to project requirements. Quantitative Environmental Analysis (QEA) is responsible for the collection of water column samples.

On August 30, 2007, Environmental Standards representative Mr. Daniel P. Claycomb, P.G. (the “Auditor”) performed an audit of QEA water column sampling activities. The objective of the audited activities was to collect water column samples at the Albany and Poughkeepsie locations. The August 2007 audit performed by Environmental Standards focused on an evaluation of several important aspects of the field activities being performed.

The following general headings were used to group field-audit activities:

1. Pre-Task Planning, Coordination, and Management
2. Field Documentation/Records
3. Water Column Sampling Activities
4. Chain-of-Custody
5. Decontamination
6. Sample Packaging
7. Waste Management
8. General Health & Safety

During the field audit, the Auditor utilized a field audit checklist that was developed specifically for GE BMP water column sampling activities (Attachment 1). This checklist contained pertinent items for each of the above subject headings that provided the basic guidelines for a comprehensive audit.

Due to the nature of a field audit, some critical statements are presented in this report. These statements are based on observations made in the field and address those areas in which project field team deficiencies were noted and where changes may be appropriate. An exhaustive list of those activities performed in accordance with the project control documents and observed to be in compliance with standard industry protocol is not presented in this audit report. This report identifies the type and source of deviations from the primary control documents of concern (mainly, the QAPP, dated May 2004 [Revision 2], that contains the relevant SOPs for the project). This audit report has been prepared exclusively for GE's use.

2.0 Audit Findings

The Auditor observed QEA field personnel conduct water column sampling from the boat at the Albany and Poughkeepsie sampling locations on August 30, 2007. Field activities were observed to evaluate field personnel compliance with the project control documents. Observations of field procedures were recorded on a field audit checklist.

QEA has been conducting the sampling activities associated with the water column sampling program since its inception in 2004. The Field Team Leader (Mr. Chris Yates) has been overseeing the sampling program during this time. Mr. Yates (as well as other QEA sampling personnel) has been subject to numerous field audits by Environmental Standards and other project stakeholders. Considering QEA's extensive experience with the sampling program and the continued field auditing efforts, the Auditor observed that the field team was generally compliant with the project control documents and noted only two minor deviations from the control documents.

The following sections of this report provide the findings of the audit/evaluation and follow the major headings presented in Section 1.0. Comments are followed by recommendations that the field team may wish to consider when conducting future sampling programs and related field activities.

2.1 Pre-Task Planning, Coordination, and Management

QEA is the contractor for the field-sampling program. For sampling activities observed during the August 2007 field audit, QEA designated Mr. Chris Yates as Field Team Leader and Mr. Chris Pelrah as Field Team Assistant. Field personnel were observed to be generally well prepared for the field activities and had properly planned and coordinated activities with the client, their office, and the laboratory.

2.2 Field Documentation/Records

Sampling information is recorded utilizing a portable lap top computer following the collection of each sample. No deficiencies observed or reported.

2.3 Water Column Sampling Activities

Sampling activities at the Albany and Poughkeepsie sampling locations consisted of collecting mid-channel samples only (via a boat) for laboratory analysis of polychlorinated biphenyls (PCBs) and total suspended solids (TSS). Following sample collection, the samples were placed in a cooler on the boat for temporary storage during transportation back to shore. The Auditor observed that the temporary storage cooler did not contain wet ice for temperature preservation of the samples. The cooler on shore used for primary sample storage did contain ice.

Recommendation: Although the samples are in the temporary storage cooler for only a short period of time, the Auditor recommends that the field crew place wet ice in the cooler for immediate temperature preservation of the samples.

2.4 Chain-of-Custody (COC)

No deficiencies observed or reported.

2.5 Decontamination

No deficiencies observed or reported.

2.6 Sample Packaging

Sample bottleware is to be placed in sealable plastic bags upon collection (SOP for the collection of water samples, Section 8.0). The Auditor observed that this procedure was not followed.

Recommendation: Field personnel should place the sample bottleware in a sealable plastic bag upon collection to help preserve sample labels (in case of contact with wet ice) and to protect against cross-contamination once the bottleware is placed in a cooler with other samples.

2.7 Waste Management

No deficiencies observed or reported.

2.8 General Health & Safety

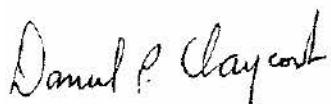
No deficiencies observed or reported.

3.0 Conclusions

The field audit conducted by Environmental Standards revealed that the audited QEA field crew conducted its work in a professional manner and complied with most of the procedures in the QAPP and applicable SOPs. The field crew was receptive to recommendations made by the Auditor, and when possible, incorporated the recommendations immediately.

The few performance deficiencies noted during the audit have been addressed in Section 2.0. The deficiencies/deviations cited in this audit report would not likely have resulted in a major impact to sample quality and would not likely have jeopardized the data quality objectives of the project. When possible, the recommendations were discussed with the field team at the time of occurrence. A debriefing meeting was held with the QEA field team leader at the conclusion of the audit.

Audit performed by:



Daniel P. Claycomb, P.G.
Director of Geosciences/Principal

Report reviewed by:



David R. Blye, CEAC
Quality Assurance Specialist/Principal
Project Manager

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Date: 11/2/07

ATTACHMENT 1

GENERAL ELECTRIC COMPANY
HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - WATER COLUMN

SAMPLING AND ANALYSIS

FIELD AUDIT CHECKLIST

Project Location: Albany/Poughkeepsie, NY

Environmental Standards' Job #: Y4062425

Date(s) of Field Audit: August 30, 2007

Time(s) of Field Audit: 10:00AM Albany, NY

Environmental Standards' Auditor: Daniel P. Claycomb, P.G.

QEA Field Team: Chris Yates, Chris Pelrah

GENERAL ELECTRIC COMPANY

HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - WATER COLUMN

SAMPLING AND ANALYSIS

FIELD AUDIT CHECKLIST

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - WATER COLUMN****SAMPLING AND ANALYSIS****FIELD AUDIT CHECKLIST**

ENVIRONMENTAL STANDARDS, INC.				Page 2 of 7
Water Column Sample Collection				
<i>Supplies and Equipment</i>	Y E S	N O	N A	COMMENTS
Are all sampling vessels equipped with:				
-Required safety equipment	X			
-Positioning system (GPS, spuds, anchors)				-Center channel between 2 piers
-USGS style Depth Integrating Sampler (DH-59 or equivalent)				
-Portable Bridge Crane		X		
-Portable winch w/ precise two-directional line speed control	X			
-Laptop computer with Printer (with Microsoft Access 2002)	X			
-Disposable gloves	X			
-Laboratory-supplied organic-free water		X		
-Field Log		X		-Do all on computer.
-Chain of Custody forms and labels for containers	X			
-Sample Containers	X			
-Resealable food storage bags				-Need to do upon sample collection. Sample frig overnight. Temp blank with end of week pick-up.
-Cooler with temperature blank and ice				
-Trash bags			X	
-YSI 6920 (or equivalent) multi-parameter probe w/ 100 ft of cable	X			
-Data logger	X			
-Data transfer cable	X			
-Calibration fluids for water quality parameter measurement	X			

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - WATER COLUMN****SAMPLING AND ANALYSIS****FIELD AUDIT CHECKLIST**

ENVIRONMENTAL STANDARDS, INC.				Page 3 of 7
Water Column Sample Collection				
	Y E S	N O	N A	COMMENTS
<i>Pre-Sample Collection</i>				
Was the multi-parameter probe (YSI 6920 or equivalent) calibrated using the calibration fluids as per the instrument manufacturer's instructions at the beginning of each sampling day?	X			Call in office in morning – check at end of day.
Does the instrument data logger have sufficient memory and battery power for the day's sampling event?	X			
Are the date and time on the instrument data logger accurate?	X			
Were the probe measurements only taken after 5 minutes of any vessel traversing near the sampling location (bridge location) or setting spuds or other anchoring device (boat access)?	X			
Was the probe lowered to mid-depth in the water column and did at least 30 seconds pass by before the readings were logged with the data logger?	X			
Were consecutive measurements (at least one minute apart) taken to verify probe stability at least once per day?	X			At Poughkeepsie.
If the consecutive measurements appeared to be off by 20% or more, was the probe recalibrated and the consecutive readings repeated?			X	
At the end of each day, was the probe immersed in calibration fluid to assess instrument drift or loss of calibration? What were the results?	X			
For samples to be collected by boat access, are vessels navigated to within 10 ft. of previously defined target coordinates?	X			
Were the actual GPS coordinates recorded?		X		
Prior to sample collection, were measurements for temperature, dissolved oxygen (DO), pH, conductivity, and turbidity obtained using the probe?	X			
For bridge locations, was a portable bridge crane maneuvered into position above the sampling location (unless the depth-integrating sampler was to be lowered and retrieved manually)?			X	
For samples to be collected by boat access, was a portable crane with line speed control set up?	X			
Did field personnel put on a new pair of disposable gloves prior to sample collection?	X			

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - WATER COLUMN****SAMPLING AND ANALYSIS****FIELD AUDIT CHECKLIST**

ENVIRONMENTAL STANDARDS, INC.				Page 4 of 7
Water Column Sample Collection				
<i>Sample Collection</i>	Y E S	N O	N A	COMMENTS
Was a new sample collection vessel placed in the depth integrating sampler (1 qt for centroid locations or 1 pt For EDI locations)? Note the same container should be used at all EDI sub-stations for each location.	X			
Did field personnel determine the proper amount of sample that will be required from each station or sub station to fill all sample containers for a location? The volume must be adjusted such that approximately equal volume will be collected at each sub-station and that little or no sample is collected that is not needed to fill sample containers.		X		Only mid-channel collected.
Was the sampler properly calibrated to the water depth and river flow conditions to produce the desired sample volume (<i>i.e.</i> , was the proper size [1/4", 3/16", 3/8"] nozzle installed)?	X			
Was the sampler lowered until 75% of the water depth was reached (distance to be determined during prior surveying)?	X			Only filling bottles on way up.
Once the 75% water depth was reached, was the sampler retrieved using the same approximate line speed used to deploy the sampler?	X			75% ex Poughkeepsie – to deep 2' at Albany.
Once the sampler was retrieved, was the sample vessel no more than approximately 90% filled and not significantly below the desired volume? If not, was the sample discarded and the sampling procedures adjusted accordingly until the appropriate sample volume was collected?	X			
Multiple sampler deployments will be required to obtain sufficient sample volume. Each time the sampler is retrieved, is the amount of sample distributed to each sample container based on the estimated number of sample deployments?		X		PCB's TSS bottles use only – only required one deployment.
Do the sample containers and volumes used meet the QAPP specifications (Section B3 and Table B-5)?	X			
Were the sample containers labeled appropriately (Section B3 of the QAPP)?	X			
Was the sample collection vessel used at each station placed in a re-sealable plastic bag and labeled with the date, time, and station (the sample vessel is to be submitted to the laboratory)?		X		Need to do at time of collection.

GENERAL ELECTRIC COMPANY
HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - WATER COLUMN
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST

ENVIRONMENTAL STANDARDS, INC.		Page 5 of 7		
Water Column Sample Collection				
<i>Sample Collection (Cont.)</i>	Y E S	N O	N A	COMMENTS
Was each sample container placed in a re-sealable plastic storage bag and placed in a cooler with ice to chill the samples to approximately 4°C?	X			Need bags upon sample collection.
Was a temperature blank placed in each cooler?				
Were proper Chain-of-Custody procedures followed as specified in Section B3 of the QAPP?	X			
Were the appropriate QA/QC samples collected? (Record which QA/QC of the following were collected for the event) -Blind duplicate samples? -Matrix spike samples? -Matrix spike duplicate/laboratory duplicate samples? -Equipment blank samples?		X		None required today – done earlier in the week.
Are equipment blanks prepared in the following manner: -Field personnel wears disposable gloves -A decontaminated ¼ inch nozzle and a new sample collection vessel are placed in the depth integrating sampler -Laboratory-supplied organic-free water is poured into the sample collection vessel -When nearly full, the sample collection vessel is removed and distributed to appropriately labeled sample containers -The process is repeated until adequate sample volume is obtained -After collection, the equipment blank is handled in a manner that is consistent with all other environmental samples		X		
Are the samples sent to each laboratory daily by courier or overnight delivery?	X			
Are all field data recorded in the field database via laptops and a hard copy of field log printed after each sample collection?	X			

GENERAL ELECTRIC COMPANY

HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - WATER COLUMN

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HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - WATER COLUMN

SAMPLING AND ANALYSIS

FIELD AUDIT CHECKLIST



FIELD AUDIT REPORT FOR FISH COLLECTION ACTIVITIES
ON SEPTEMBER 11, 2007
FOR THE HUDSON RIVER PCBs SITE

Baseline Monitoring Program

March 20, 2008

Prepared for:

GENERAL ELECTRIC COMPANY
Corporate Environmental Programs
Albany, NY

Prepared by:

ENVIRONMENTAL STANDARDS, INC.
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Attachments

Attachment 1 Area Map

Attachment 2 Field Audit Checklist

1.0 Introduction

In February 2002, the United States Environmental Protection Agency (US EPA) issued a Record of Decision (ROD) for the Hudson River PCBs Site (US EPA, 2002). The selected remedy includes dredging of approximately 2.65 million cubic yards of PCB-containing sediments. In the ROD, US EPA divided the Upper Hudson River into the following three sections:

- Section 1 – Former Location of Fort Edward Dam to Thompson Island Dam (approximately 6.3 miles).
- Section 2 – Thompson Island Dam to Northumberland Dam (approximately 5.1 miles).
- Section 3 – Northumberland Dam to the Federal Dam in Troy (approximately 29.5 miles).

The ROD specifies that a Baseline Monitoring Program (BMP) be conducted to establish baseline river conditions to allow for an evaluation of changes in those conditions that result from implementation of the selected remedy and verification that the remedy ultimately succeeds in achieving the remedial action objectives set out in the ROD. The purpose of the current field sampling project is to collect the information necessary to characterize the PCB concentrations in representative Upper Hudson River resident sport and forage fish prior to dredging. In addition, the data generated during the BMP combined with historical data will be used in spatial and temporal trend analysis of PCB concentrations in the Upper Hudson River fish.

General Electric Company (GE) and its consultants have developed the Quality Assurance Project Plan (QAPP) for the Hudson River Baseline Monitoring Program to collect data that will be used to fulfill those goals. The QAPP entails the collection, processing, and analysis of fish collected from areas that have been historically monitored for PCB trend analysis. For the purposes of the BMP, portions of the river sections delineated in the ROD (as indicated above) were further subdivided into the following reaches:

- Reach 8 – Thompson Island Pool (the entirety of Section 1).
- Reaches 6 and 7 – Fort Miller and Northumberland Pools (the entirety of Section 2).
- Reach 5 – Stillwater Pool (portion of Section 3 extending from Northumberland Dam to Stillwater Dam).

GE has retained Environmental Standards, Inc. (Environmental Standards) to conduct field audits of field activities and to perform other QA/QC functions regarding the BMP. The field audits are performed to provide GE with an indication of the quality of field services provided by the field contractors as part of the BMP and to ensure that the field contractors are adhering to project requirements.

The BMP team members responsible for collection and field processing of fish are Quantitative Environmental Analysis (QEA) and Blasland, Bouck, and Lee (BB&L).

At the time of the audits, QEA and BB&L had no contractual business relationship with Environmental Standards; therefore, the audits represent an independent third-party evaluation of the contractors' field performance.

Fish sampling activities were initiated for the 2007 Fall field season on September 11, 2007. On September 11, 2007, Environmental Standards representative Mr. David R. Blye, CEAC, conducted an in-person audit of QEA and BB&L field activities being performed at the site. The objective of the audited activities was to collect and process yearling pumpkinseed and forage fish species from Reach 8 of the Hudson River at the Thompson Island Pool (Attachment 1). Both fish collection and processing activities were audited over a period of time extending from 0730 hours to approximately 1300 hours. The audit conducted by Environmental Standards focused on an evaluation of several important aspects of the field activities performed that day.

The following general headings were used to group field-audit activities:

1. Pre-Task Planning, Coordination, and Management
2. Field Documentation/Records
3. Fish Sample Collection
4. Fish Sample Processing
5. Training
6. Chain-of-Custody
7. Decontamination
8. Sample Packaging
9. Waste Management
10. General Health & Safety

During the field audit, the Environmental Standards Auditor utilized a field audit checklist that was developed specifically for GE Fish Monitoring Program field activities. The completed checklist (Attachment 2) contains pertinent items regarding each of the above headings that provided the basic guidelines for a comprehensive audit.

Due to the nature of a field audit, some critical statements are presented in this report. These statements are based on observations made in the field and address those areas in which project field team deficiencies were noted and where changes may be appropriate. An exhaustive list of those activities performed in accordance with the project control documents and observed to be in compliance with standard industry protocol is not presented in this audit report. This report identifies the type and source of deviations from the primary control documents of concern (mainly, the QAPP dated May 2004 [Revision 2], which contains the relevant Standard Operating Procedures [SOPs] for the project). This audit report has been prepared exclusively for GE's use.

2.0 Audit Findings

During the field activities, the Auditor observed the QEA and BB&L field personnel collect and process fish from the Upper Hudson River. Field activities were observed to evaluate field personnel compliance with the project control documents. Observations of field procedures were recorded on a field audit checklist. For fish collection activities, the Auditor observed electrofishing techniques employed during the collection of samples used for the BMP.

The following sections provide the findings of the audit/evaluation and follow the major headings presented in Section 1.0. Comments may be followed by recommendations and/or suggestions that the field team may wish to consider when conducting future sampling programs and related field activities.

2.1 Pre-Task Planning, Coordination, and Management

Environmental Standards did not participate in off-site pre-task planning, coordination, and/or management. Activities observed on site during the first morning of sample collection indicated that the field team was well organized and well prepared to implement the tasks the team was performing.

QEA, the lead contractor for the field sampling program, designated Dr. Margaret Murphy as the Field Team Leader and manager of fish collection and processing activities. Dr. Murphy was observed to be generally well prepared for the field activities and had properly planned and coordinated activities with the client, her office, and the other contractors. Mr. Chris Pelrah and Mr. Jim Ryan of QEA were on site and involved in sample processing being conducted in a field trailer at the Route 8 staging area.

BB&L designated Mr. Matt Frackelton as the operator of the electrofishing boat with crew support by Mr. Jason Vogel. Mr. Frackelton was observed to be generally well prepared for safe and proper operation of the boat and had properly planned and coordinated activities with the client, his office, and the other contractors.

Mr. Michael Ken of the New York State Department of Environmental Conservation (NYSDEC) Division of Fish, Wildlife and Marine Resources (DFWMR) was also present during the audit to perform oversight services on behalf of the US EPA.

2.2 Field Documentation/Records

Dr. Murphy maintained control over site quality assurance documents and had reference copies with her on site, securely locked in her vehicle while site activities were being conducted.

Dr. Murphy maintained and updated the field log for the activities that occurred on site, with the exception of the fish processing activities, which were recorded directly in an electronic field log by Mr. Pelrah and Mr. Ryan using a laptop computer.

Chain-of-custody documentation for the laboratory samples resulting from fish processing was generated electronically on site via a notebook computer and portable printer. Data were thus recorded and retained electronically in the notebook computer and Chain-of-Custody (COC) records and sample labels were generated in hardcopy form from the same data and data entry. Data were backed up onto QEA's office-based server on at least a daily basis, but in reality, occurred more frequently by way of a notebook computer cellular-service modem card.

2.3 Fish Sampling Activities

All fish sampling was conducted by electrofishing techniques; therefore, this technique was the only technique evaluated by the Auditor. Sampling activities conducted during this late-summer sampling event were used to satisfy the requirements of the BMP. Sampling efforts were conducted during daylight hours.

The BB&L electrofishing boat was staffed with three personnel (who were well prepared for sample collection efforts) and who wore appropriate personal protective equipment (PPE) for the task. The BB&L boat was rigged specifically for electrofishing utilizing two assemblies of steel cables hung

from the front of the boat that generated a field of electricity to stun fish in the boat's path. The Auditor was able to witness an electrofishing event during which a pulsed current was used at amperages adequate to temporarily stun fish.

The BB&L electrofishing boat was equipped with a number of automatic and manual devices that required calibration prior to use. Dr. Murphy calibrated the Horiba U-10 multiple parameter meter for conductivity at the start of the field collection day. The Auditor reviewed the calibration and water parameter measurement records and found the records to be complete and up-to-date. Water parameters (conductivity and temperature) were measured at each location prior to commencing electrofishing to adjust the level of applied electricity based upon the specific water conditions.

Samples were collected by the QEA/BB&L field team by electrofishing along transects near the weed line of near-shore areas resulting in the collection of fish from depths averaging 2 to 4 feet and from no deeper than 6 feet. BB&L shocked, netted, and placed selected fish species into a live hold during each 15-minute pass. The BB&L boat continued to collect specimens until a pre-determined (by Dr. Murphy) significant number of fish had been collected. Captured fish were then returned to a pre-determined landing where they were transferred to covered, water-filled, 5-gallon tote buckets to await processing. The BB&L boat then departed for additional sampling bouts while processing efforts were conducted by QEA personnel.

2.4 Fish Sample Processing

Sample processing took place in a field trailer at the Route 8 staging area. Sample processing was conducted by Mr. Pelrah and Mr. Ryan. One individual "called out" the identity of the fish species and its measured weight and length while the other team member recorded the data onto a notebook computer. It should be noted that the fish sample processors had with them, and regularly used/referenced, a commercial field guide book for more accurate identification of the species that were collected by electrofishing. Once identified, measured, and recorded, the fish were then processed for scale collection and wrapped in foil. A printed sample tag was affixed to the outside of the foil, and the sample was then placed in a plastic bag and into storage on ice in a cooler chest.

The team performed well together and the samples were processed consistently and efficiently.

2.5 Training

Both sample collection and processing teams were well trained in their job duties as evidenced by the consistency and efficiency of the sampling event conducted. The Auditor and the samplers discussed their knowledge, training, experience, and backgrounds during the course of the audit.

2.6 Chain-of-Custody

Chain-of-Custody (COC) Records were prepared electronically through data entry and software manipulation by the operator of the on-site notebook computer. Although the Auditor did not observe the final printed product at the end of the day, the Auditor did observe the data on the computer as it would have appeared when printed at day's end to serve as the COC Record.

2.7 Decontamination

In general, disposable sampling equipment was used for processing the fish. The only equipment requiring decontamination was the small square plastic pans used to hold and weigh the fish. Decontamination of these plastic pans was observed to include rinsing the pans with river water followed by drying with paper towels.

Recommendation: The Auditor recommended to the fish sample processors and to the Field Team Leader that a clean piece of aluminum foil be placed inside the plastic pan to line the surface of the pan that would come into contact with fish after rinsing the pan with river water and drying it. The aluminum foil should be changed between each use of the pan to prevent potential cross-contamination from sample to sample. The sample processing and Field Team Leader implemented this suggestion immediately upon discussing it with them.

2.8 Sample Packaging

Fish samples were wrapped in commercially available aluminum foil ("Reynolds Wrap"), labeled, and placed into plastic zipper-style sealable plastic ("Hefty Zip-Loc") bags, which were then placed in coolers on wet ice immediately after processing. Fish scales were placed into small manila envelopes and sealed with a label affixed to the envelope; the envelopes were placed sequentially into a box.

2.9 Waste Management

No deficiencies observed or reported.

2.10 General Health & Safety

All members of the sample collection and processing teams wore appropriate PPE and conducted themselves in a professional manner throughout the sampling event.

3.0 Conclusions

The field audit performed by Environmental Standards identified that the QEA and BB&L field crews conducted their work in a professional manner and complied with most of the procedures outlined in the QAPP and applicable SOPs. The field crews were receptive to the questions and recommendations of the Environmental Standards Auditor. The one performance deficiency identified during the audit was addressed at the time it was observed. The deficiency identified in this audit report would not likely have resulted in a major impact to sample quality and would not likely have jeopardized the data quality objectives of the project or the health and safety of the

personnel conducting the sampling. The recommendations presented herein were discussed with Field Team Leader (Dr. Murphy) in a debriefing meeting at the conclusion of the audit.

Audit performed and report prepared by:

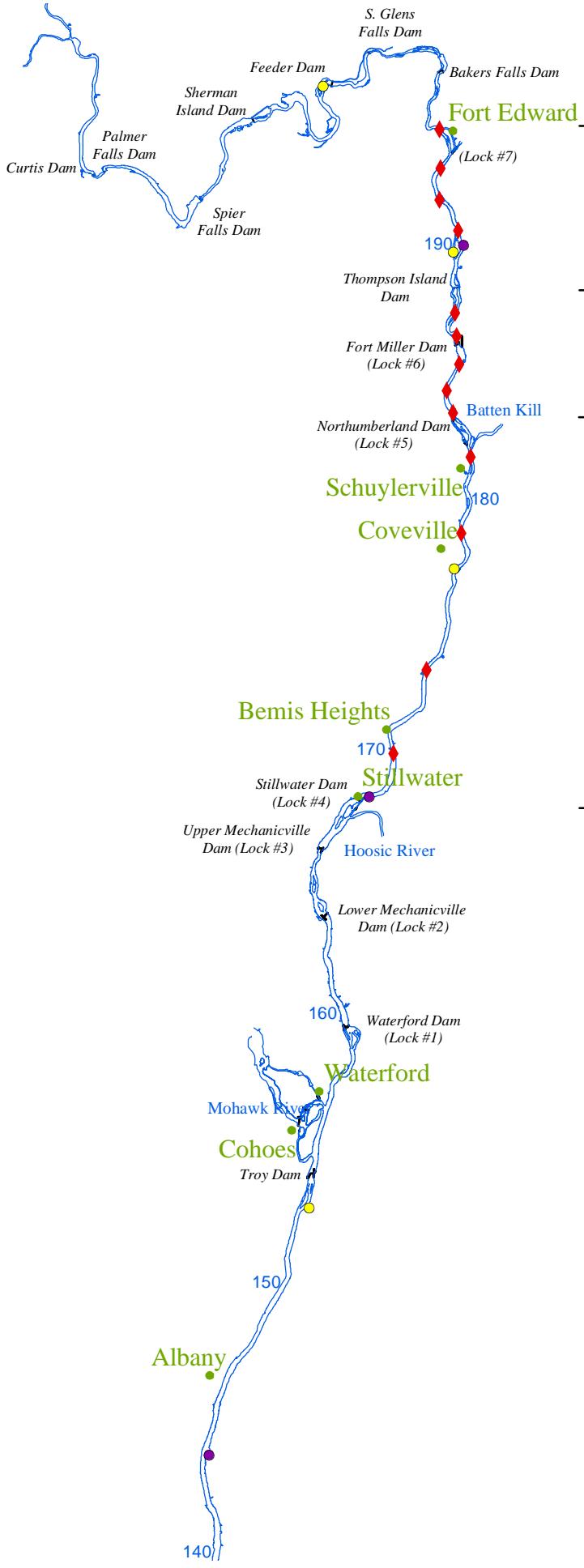
A handwritten signature in black ink that reads "David R. Blye".

David R. Blye, CEAC
Quality Assurance Specialist/
Principal

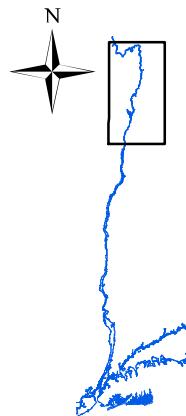
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Date: 3/20/08

ATTACHMENT 1



LOCATOR MAP OF THE UPPER HUDSON RIVER



Reach 8

Thompson Island Pool

Reaches 6 & 7

Fort Miller & Northumberland Pools

Reach 5

Stillwater Pool

GRAPHIC SCALE

0 2 4 Miles

LEGEND

Est. Proposed Sampling Locations

- NYSDEC Locations - resident adult
- NYSDEC Locations - resident forage
- ◆ Additional Proposed Locations

General Electric Company Hudson River Project

Figure A-3. Fish Monitoring Stations

Note:

1. River Miles measured from the Battery (0.0)

ATTACHMENT 2

GENERAL ELECTRIC COMPANY
HUDSON RIVER PCBs SITE
BASELINE MONITORING PROGRAM - FISH
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST

Project Location: Reach 8, Thompson Island Pool, Route 8 Staging Area

Environmental Standards' Job #: Y4062425.0006

Date(s) of Field Audit: September 11, 2007

Time(s) of Field Audit: 07:30-13:00

Environmental Standards' Auditor: David R. Blye, CEAC

GENERAL ELECTRIC COMPANY

HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - FISH SAMPLING AND ANALYSIS FIELD AUDIT CHECKLIST

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE
BASELINE MONITORING PROGRAM - FISH
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST**

ENVIRONMENTAL STANDARDS, INC.				Page 2 of 12
Fish Sample Collection				
<i>Supplies and Equipment</i>	Y E S	N O	N A	COMMENTS
The need for the equipment listed below will vary based on the specific type of sampling taking place during the audit: -Required safety equipment -Positioning system (GPS, anchors) -Laboratory grade detergent -Distilled water -Acetone and Hexane -Collection buckets -Beach seine -Buoys -Line -Gill net - Sampling Boat or aluminum electrofishing boat equipped with live well -DC generator -Variable voltage pulsator -Dip nets -Electrodes -Water temperature and conductivity meter -Volt meter -Thermometer -Tape measure -Scale -Watch -Fish Scaler -Dissecting pan/board -Scale envelopes -Glass vials -Fish collection record -Chain of Custody and Analytical Request forms -Cooler with temperature blank and ice -Aluminum foil -Zip lock bags -Fish collection permit				Safety equipment was utilized on boat. GPS equipment was not present or used during sampling. Laboratory chemicals were brought to site for use by QEA. Gill net was not used during observed sampling. Tape measure was used in sample processing trailer; samplers used a long board with markings for fish length. Glass vials were not used. Chain of Custody and Analytical Request forms were generated electronically by QEA's on-site notebook computer. Fish collection permit not reviewed, but NYSDEC representative was on-site during sample collection activities.

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - FISH**
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST

ENVIRONMENTAL STANDARDS, INC.				Page 3 of 12
Fish Sample Collection				
	Y E S	N O	N A	COMMENTS
<i>Pre-Sample Collection</i>				
Was the fish processing equipment properly decontaminated in the following manner in a designated area prior to contact with the fish? -Washed with laboratory detergent -Rinsed with distilled water -Rinsed with acetone and then, allowed to air dry -Rinsed with hexane and then, allowed to air dry -Rinsed with distilled water				Fish processing equipment generally consisted of disposable equipment. The only equipment requiring decontamination was the small square plastic pans used to hold and weight the fish. Decontamination of these plastic pans was observed to include rinsing the pans with river water and drying them with paper towels. The Auditor recommended to the fish sample processors and to the field team leader that a clean piece of aluminum foil be placed inside the plastic pan to line the surface of the pan that would come into contact with fish after rinsing the pan with river water and drying it. The aluminum foil should be changed between each use of the pan to prevent potential cross-contamination from sample to sample. The sample processing and field team leader implemented this suggestion immediately upon discussing it with them.
Was the rinsate from the equipment decontamination procedure collected and placed in appropriate disposal containers?				Rinsate disposal procedure was not observed.

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - FISH
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST**

ENVIRONMENTAL STANDARDS, INC.				Page 4 of 12
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Fish Sample Collection	Y E S	N O	N A	COMMENTS
<i>Netting using a Beach Seine</i>				
Was a beach seine appropriately used for near shore shallow study areas? -Where the net wall can extend from the surface of the water to the bottom -For capture of near-shore species or for species that use the near-shore area seasonally or daily -Where the substrate is relatively smooth so that the lead line of the seine drags along the bottom of the river preventing fish escapement		X		Seine netting was not employed during the auditor-observed portion of the audit.
Did two people start together at the downstream edge of the sample location (either wading or in boats)?		X		Seine netting was not employed during the auditor-observed portion of the audit.
Did one of the two people begin to extend the seine perpendicular to the shoreline until the net was straightened out or the water became too deep?		X		Seine netting was not employed during the auditor-observed portion of the audit.
Did both people begin walking parallel to the shoreline for a set distance before the deep end person began to swing the end of the net back to the shoreline?		X		Seine netting was not employed during the auditor-observed portion of the audit.
Were both ends of the net brought together and the net hauled onto the shoreline with the captured fish?		X		Seine netting was not employed during the auditor-observed portion of the audit.
Were the fish removed from the net and placed into buckets for identification?		X		Seine netting was not employed during the auditor-observed portion of the audit.
Were caught fish identified and assessed for the need to retain such that all unnecessary fish were immediately returned to the water?		X		Seine netting was not employed during the auditor-observed portion of the audit.

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - FISH**
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST

ENVIRONMENTAL STANDARDS, INC.	Page 5 of 12		
Fish Sample Collection			
	Y E S	N O	N A
<i>Netting using a Gill Net</i>			COMMENTS
Was the gill net used when there is 100 ft of continuous depths of greater than 3 ft and little current?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Were anchors attached to both ends of the lead line and buoys attached to both ends of the float line?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Was the gill net stacked in a large storage tub by placing the end with the larger mesh size in the tub first (for variable mesh sizes) and coiling the rest of the net into the tub?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Beginning close to the shore or in water approximately 2 m deep, was the outer end of the net removed from the storage tub and the anchor attached to the lead line and buoy attached to the float line dropped over the bow of the boat?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Was the buoy line adjusted so that the buoy is floating and the line was relatively taut?		X	Gill netting was not employed during the auditor-observed portion of the audit.
As the boat slowly moved backwards from the shore, was the remainder of the net let out while shaking out any tangles?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Once the inner end of the net was reached, was the boat stopped and the net pulled until it was taut?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Was the anchor attached to the lead line dropped overboard and the float line pulled to make sure the net was taut?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Was the buoy attached to the float line dropped in the water and the buoy line adjusted so that the buoy was floating and the line was relatively taut?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Was the gill net allowed to soak the prescribed sampling period (e.g., 1-24 hours)?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Was the gill net retrieved by first arriving at the end of the net in the deeper water and retrieving the buoy and anchor?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Was the net pulled on board and stacked in coils in the storage tub?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Were the fish removed from the set as it was brought aboard and placed into the holding bucket?		X	Gill netting was not employed during the auditor-observed portion of the audit.
Were caught fish identified and assessed for the need to retain such that all unnecessary fish were immediately returned to the water?		X	Gill netting was not employed during the auditor-observed portion of the audit.

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE
BASELINE MONITORING PROGRAM - FISH
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST**

ENVIRONMENTAL STANDARDS, INC.				Page 6 of 12
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Fish Sample Collection				
	Y E S	N O	N A	COMMENTS
<i>Electrofishing</i>				
Was electrofishing only used in areas less than 4 meters deep?	X			Depthfinder on boat. Water is 4 – 5' deep.
Was electrofishing used for fish other than yearling pumpkinseed or forage fish?		X		
Did field personnel ensure that electrofishing was not used where endangered species were present?	X			
Did field personnel wear appropriate health and safety gear (rubber hip or chest waders, rubber gloves, personal floatation devices)?	X			
Was the electrofishing boat positioned in the water in order to start upstream and work downstream?		X		Samples collected with boat headed both downstream and upstream.
Was the water conductivity and temperature measured in order to determine the appropriate operating voltage and amperage?	X			Measurement by field team leader, adjustment by boat operator.
Was the output voltage and amperage adjusted until the desired setting was obtained without harming the fish?	X			Uncollected fish were observed to return to normal activity following passing of boat and electoshock area.
Was pulsed output used to reduce the stress on the fish?	X			Operator demonstrated ability to vary pulse wavelength.
Was the output maintained for the predetermined amount of time?		X		Continual passes until adequate sample number was obtained.
Were the fish collected with dip nets and placed in the live well until processing?	X			
After processing, were all unselected fish released?		X		Any that were alive were released.

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - FISH
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST**

ENVIRONMENTAL STANDARDS, INC.				Page 7 of 12
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Fish Sample Collection	Y E S	N O	N A	COMMENTS
Was angling used only after all other methods proved unsuccessful?		X		Angling was not employed during the auditor-observed portion of the audit.
What type of lure was used to catch the fish?		X		Angling was not employed during the auditor-observed portion of the audit.
Were caught fish identified and assessed for the need to retain such that all unnecessary fish were immediately returned to the water?		X		Angling was not employed during the auditor-observed portion of the audit.

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - FISH**
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST

ENVIRONMENTAL STANDARDS, INC.					Page 8 of 12
Fish Sample Collection					
<i>General</i>		Y E S	N O	N A	COMMENTS
After a successful fish collection, was the following information entered into the Field Collection Record: -Names of field personnel collecting the samples -Date -Time and duration of collection -Actual GPS coordinates of the starting location and approximate distance of samples -Weather conditions (temperature, wind, precipitation) -Observations of river conditions (e.g., temperature, turbidity) -Species identification (genus and species) -Sample total length (nearest mm) and weight (to nearest 0.1 g) -Sample sex, if possible -Sample tag number		X			GPS coordinates were not collected or recorded during auditor-observed sampling. Fish were not sexed in the field; field personnel explained that this was to be a laboratory responsibility. Most entries are made directly to the database using laptop and remote connection. Total seconds for electroshocking is recorded too.
If fish were cut to determine sex, did field personnel not eviscerate the fish?			X		Sexing was not performed in the field.
Was the balance used for weighing the fish calibrated? How?		X			Balance was calibrated prior to use with known-weight standards (10g and 100g).
After processing, were fish stored at a temperature below 4°C and shipped immediately to the analytical laboratory along with all Fish collection Records, Chains-of-Custody, and Analysis Request documents?		X			Fish were stored on wet-ice in a cooler prior to transport to a laboratory. Documents were prepared and completed both manually and electronically.
Was a temperature blank placed in each cooler?		X			
Were proper Chain-of-Custody procedures followed as specified in Section B3 of the QAPP?		X			Generated at QEA office.
Were the appropriate QA/QC samples collected? (Record which QA/QC of the following were collected for the event) -Blind duplicate samples? -Matrix spike samples? -Matrix spike duplicate/laboratory duplicate samples? -Equipment blank samples?			X		Only lab duplicates are used for fish.
Are the samples sent to each laboratory daily by courier or overnight delivery?		X			Samples are picked up each morning by NEA.

GENERAL ELECTRIC COMPANY

HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - FISH SAMPLING AND ANALYSIS FIELD AUDIT CHECKLIST

GENERAL ELECTRIC COMPANY**HUDSON RIVER PCBs SITE****BASELINE MONITORING PROGRAM - FISH**
SAMPLING AND ANALYSIS
FIELD AUDIT CHECKLIST

ENVIRONMENTAL STANDARDS, INC.		Page 10 of 12		
Fish Sample Processing				
		Y E S	N O	N A
Bass, Bullhead, Perch				COMMENTS
If the analysis of the fish age was deemed appropriate, were the scales, spines, or otoliths collected as follows?			X	Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
-For bass and perch, were all scales removed from the fish and at least 5 scales placed in a scale envelope for storage?				All measurements made by Jim and Chris recorded information on the collection envelope.
-For bullhead, was the dorsal spine removed and placed in a scale envelope for storage?				
-Were otoliths removed and placed in glass vials for storage if deemed necessary?				
-Was the fish tag number, fish total length, weight, date, and location sampled recorded on the envelope and/or vial?				
Was the skin removed from all brown bullheads but not from any bass or perch?			X	Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
Was the examination tray lined with a clean piece of aluminum foil (shiny side down) and the fish place on the lined tray?	X			Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
Was the fish cut along the ventral midline of the fish from the vent to the base of the jaw?			X	Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
Was a diagonal cut made from the base of the cranium to just below the gill, to the ventral side just behind the pectoral fin?			X	Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
Was the flesh removed from the ribcage from one-half of the fish by cutting from the cranium along the spine and dorsal rays to the caudal fin?			X	Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
Did the ribs remain on the fillet?			X	Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
Was the fillet placed on a clean piece of aluminum foil (shiny side down) and wrapped?			X	Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
Was an identification label that included the fish tag number, fish total length and weight, date, and location sampled attached to the wrapped fish?	X			Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected.
Was the wrapped, labeled fish placed in a pre-labeled plastic bag?	X			Bass, Bullhead, and/or Perch not collected during auditor-observed sampling. Forage fish collected. Aluminum foil wrapped and labeled with printed label.

GENERAL ELECTRIC COMPANY

HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - FISH SAMPLING AND ANALYSIS FIELD AUDIT CHECKLIST

GENERAL ELECTRIC COMPANY

HUDSON RIVER PCBs SITE

BASELINE MONITORING PROGRAM - FISH

SAMPLING AND ANALYSIS

FIELD AUDIT CHECKLIST

**APPENDIX C
BMP PROJECT DATABASE
(CD-ROM ATTACHED)**

ELECTRONIC RECORD TARGET SHEET

SITE NAME:	HUDSON RIVER PCBS
CERCLIS ID:	NYD980763841
SEMS-RM DOC ID:	152053
ALT. MEDIA TYPE:	ACCESS
DOCUMENT FORMAT:	MDB
NATIVE FORMAT LOCATION/FILENAME:	APPENDIX C - BMP PROJECT DATABASE - 2007 BMP EXPORT FISH APPENDIX C - BMP PROJECT DATABASE - 2007 BMP EXPORT WATER
COMMENTS:	ACCESS FILES ARE ATTACHED WITH TARGET SHEET

Hudson River Baseline Monitoring Program
USEPA Fish Database Export Dictionary

EVENTS

#	Attribute Name	Description	Data Type (Size)	Units	Notes
1	SAMPLING_EVENT_ID	Unique sampling event ID. Used to link fish EVENTS table with DESCRIPTION table.	Text(15)		Example: "ND1-040603-01"
2	STATION_ID	Sampling location abbreviation.	Text(5)		
3	STATION_NAME	Full location name.	Text(50)		
4	SAMPLE_COLLECT_METHOD	Indicates fish sample collection method.	Text(5)		NET: netting ES: electroshocking ANG: angling
5	EVENT_START_DATE_TIME	Date and time sampling event initiated.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM
6	EVENT_END_DATE_TIME	Date and time sampling event completed.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM
7	START_NORTHING	Northing coordinate of upstream end of sampling location (NY state plane east NAD83).	Text(20)	ft	
8	START_EASTING	Easting coordinate of upstream end of sampling location (NY state plane east NAD83).	Text(20)	ft	
9	END_NORTHING	Northing coordinate of downstream end of sampling location (NY state plane east NAD83).	Text(20)	ft	
10	END_EASTING	Easting coordinate of downstream end of sampling location (NY state plane east NAD83).	Text(20)	ft	
11	COORDINATE_UNIT	Unit of measurement for the northing and easting coordinates.	Text(15)		
12	WATER_TEMP	Temperature of water at beginning of sampling event.	Double	Degrees C	
13	TURBIDITY	Turbidity of water at beginning of sampling event.	Double	see Field 14	
14	TURBIDITY_UNITS	Unit of measurement for turbidity.	Text(5)		
15	CONDUCTIVITY	Conductivity of water at beginning of sampling event.	Double	see Field 16	
16	CONDUCTIVITY_UNITS	Unit of measurement for conductivity.	Text(5)		
17	WEATHER	Weather conditions during sampling event.	Text(100)		

Hudson River Baseline Monitoring Program
USEPA Fish Database Export Dictionary

#	Attribute Name	Description	Data Type (Size)	Units	Notes
18	COMMENTS	General comments or field observations.	Text(255)		
19	SAMPLER_INITIALS	Initials of sampler.	Text(5)		

Hudson River Baseline Monitoring Program
 USEPA Fish Database Export Dictionary

DESCRIPTION

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
1	FIELD_SAMPLE_ID	Unique field sample ID. Used to link to Results tables.	Text(50)		Example: "RTN-040609-L1-C01"
2	SAMPLING_EVENT_ID	Event ID for fish sample. Used to link fish EVENTS table with DESCRIPTION table.	Text(15)		
3	SAMPLE_MATRIX_CODE	Code which distinguishes between different types of sample matrix.	Text(50)		"F"
4	SAMPLE_TYPE_CODE	Code which distinguishes between different types of samples.	Text(50)		"ENV"
5	SAMPLE_SOURCE	This field identifies where the sample came from.	Text(10)		"Field" or "Lab"
6	SAMPLE_DATE_TIME	Date and time sample was collected.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM
7	CHAIN_OF_CUSTODY	Chain of custody identifier.	Text(50)		Example: "COC040603-A01-01"
8	SAMPLE_ARCHIVED	Indicates if a sample was archived.	Text(50)		"Yes" or "No"
9	ARCHIVE_ONLY	Indicates if a sample was archived only.	Text(50)		"Yes" or "No"
10	EPA_SPLIT	Indicates if the sample was chosen as a split by the USEPA.	Text(50)		"Yes" or "No"
11	COMPOSITE_YN	Indicates if sample is a composite.	Text(50)		"Yes" or "No"
12	NUM_IN_COMPOSITE	If composite sample, indicates number of fish in composite.	Long Integer		
13	SPECIES_CODE	NYSDEC abbreviations for species of fish sample.	Text(20)		
14	TOTAL_LENGTH	Total length of fish sample for individuals (nearest mm).	Long Integer	mm	
15	LENGTH_UNIT	Unit of measurement for length.	Text(5)		
16	WEIGHT	Total weight of fish sample for individuals (nearest 0.1 grams).	Double	g	
17	WEIGHT_UNIT	Unit of measurement for weight.	Text(5)		
18	SEX	Sex of fish sample.	Text(5)		M: male F: female U: unknown
19	AGE	Age of individual fish.	Long Integer		
20	SAMPLE_PREP	Indicates type of sample collected.	Text(20)		"fillet" or "whole body"
21	GENERAL_DESCRIPTION	General comments or field observations at time of sample collection.	Text(255)		
22	CPUE_ID	Corresponding ID from "catch per unit effort" sampling.	Text(30)		

Hudson River Baseline Monitoring Program
USEPA Fish Database Export Dictionary

RESULTS PCBs and RESULTS NONPCBs

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
1	FIELD_SAMPLE_ID	Unique field sample ID.	Text(50)		Example: "RTN-040609-L1-C01"
2	LAB_SAMPLE_ID	Laboratory sample identifier.	Text(255)		
3	SAMPLE_TYPE_CODE	Code which distinguishes between different types of sample.	Text(25)		ENV: environmental sample MB: method blank LCS: laboratory control sample MS: matrix spike MSD: matrix spike duplicate
4	SAMPLE_MATRIX_CODE	Code which distinguishes between different types of sample matrix.	Text(25)		"F"
5	SAMPLE_SOURCE	This field identifies where the sample came from.	Text(10)		"Lab" or "Field"
6	SAMPLE_COMMENT	Sample comments as necessary.	Text(255)		
7	LAB_ANALYTICAL_METHOD	Laboratory analytical method name or description.	Text(50)		
8	ANALYSIS_DATE_TIME	Date of sample analysis.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM
9	TOTAL_OR DISSOLVED	"T" for total (metal) concentration, "D" for dissolved or filtered (metal) concentration, or "N" for organic (or other) constituents for which neither "total" nor "dissolved" is applicable.	Text(1)		"T", "D", or "N"
10	COLUMN_NUMBER	"1C" for first column analyses, "2C" for second column analyses, or "NA" for analyses for which neither "1C" nor "2C" is applicable.	Text(5)		"1C", "2C", or "NA"
11	TEST_TYPE	Type of test.	Text(20)		"initial", "reextract", and "reanalysis"
12	CAS_RN	Chemical Abstracts Registry Number for the parameter if available.	Text(20)		
13	PARAMETER	Chemical name.	Text(60)		
14	RESULT_VALUE	Analytical result.	Double		blank for non-detects
15	RESULT_ERROR_DELTA	Error range applicable to the result value.	Double		

Hudson River Baseline Monitoring Program
 USEPA Fish Database Export Dictionary

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
16	RESULT_TYPE_CODE	"TRG" for a target or regular result, and "SUR" for surrogates.	Text(10)		“TRG” or “SUR”
17	REPORTABLE_RESULT	"Yes" for results which are considered to be reportable, or "No" for non-reportable results.	Text(10)		“Yes” or “No”
18	DETECT_FLAG	"Y" for detected analytes or "N" for non-detects.	Text(3)		“Y” or “N”
19	QC_LEVEL	Status of data quality review.	Text(50)		“Verified” or “Validated”
20	RESULT_QUALIFIERS	Qualifiers assigned to samples during data verification /validation.	Text(50)		
21	ORGANIC_YN	"Y" for organic constituents or "N" for inorganic constituents.	Text(3)		“Y” or “N”
22	MDL	Method detection limit.	Double		
23	RL	Detection limit that reflects conditions such as dilution factors and moisture content.	Double		
24	QL	Concentration level above which results can be quantified with confidence.	Double		
25	RESULT_UNIT	Units of measurement for the result.	Text(15)		
26	DETECTION_LIMIT_UNIT	Units of measurement for the detection limit(s).	Text(15)		
27	RESULT_COMMENT	Result specific comments.	Text(255)		
28	QC_ORIGINAL_CONC	The concentration of the analyte in the original (unspiked) sample.	Double		
29	QC_SPIKE_ADDED	The concentration of the analyte added to the original sample.	Double		
30	QC_SPIKE_MEASURED	The measured concentration of the analyte.	Double		
31	QC_SPIKE_RECOVERY	The percent recovery calculated.	Double		
32	QC_DUP_ORIGINAL_CONC	The concentration of the analyte in the original sample.	Double		
33	QC_DUP_SPIKE_ADDED	The concentration of the analyte added to the original sample.	Double		
34	QC_DUP_SPIKE_MEASURED	The measured concentration of the analyte	Double		

Hudson River Baseline Monitoring Program

USEPA Fish Database Export Dictionary

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
		in the duplicate (for background corrected matrix spike duplicates).			
35	QC_DUP_SPIKE_RECOVERY	The duplicate percent recovery calculated.	Double		
36	QC_RPD	The relative percent difference calculated.	Double		
37	QC_SPIKE_LCL	Lower control limit for spike recovery.	Double		
38	QC_SPIKE_UCL	Upper control limit for spike recovery.	Double		
39	QC_RPD_CL	Relative percent difference control limit.	Double		
40	QC_SPIKE_STATUS	Indicates whether the spike recovery was within control limits. The "*" character indicates failure; otherwise blank.	Text(20)		
41	QC_DUP_SPIKE_STATUS	Indicates whether the duplicate spike recovery was within control limits. The "*" character indicates failure; otherwise blank.	Text(20)		
42	QC_RPD_STATUS	Indicates whether the relative percent difference was within control limits. The "*" character indicates failure; otherwise blank.	Text(20)		
43	LAB_MATRIX_CODE	Code which distinguishes between different types of lab sample matrix.	Text(10)		"F"
44	ANALYSIS_LOCATION	"FI" for field instrument or probe, "FL" for mobile field laboratory analysis, or "LB" for fixed-based laboratory analysis.	Text(2)		"FI", "FL", or "LB"
45	BASIS	"Wet" for wet-weight basis reporting, "Dry" for dry-weight basis reporting, or "NA" for tests for which this distinction is not applicable.	Text(10)		"WET", "DRY", or "NA"
46	DILUTION_FACTOR	Effective test dilution factor.	Double		
47	PREP_METHOD	Laboratory sample preparation method name or description.	Text(50)		Yes
48	PREP_DATE_TIME	Date and time of sample preparation military format.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM
49	LAB_NAME_CODE	Unique identifier of the laboratory.	Text(15)		

Hudson River Baseline Monitoring Program
 USEPA Fish Database Export Dictionary

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
50	DATA_PACKAGE_LEVEL	Data package level.	Text(10)		“A”, “B”, or “AB”
51	PERCENT_MOISTURE	Percent moisture of the sample portion used in this test.	Double		
52	SUBSAMPLE_AMOUNT	Amount of original sample used in sample preparation.	Double		
53	SUBSAMPLE_AMOUNT_UNIT	Unit of measurement for subsample amount.	Text(15)		
54	SAMPLE_DELIVERY_GROUP	Sample delivery group.	Text(20)		
55	TEST_COMMENT	Comments about the test as necessary.	Text(255)		
56	FINAL_VOLUME	The final amount/volume of the sample, extract, or digestate after sample preparation.	Double		
57	FINAL_VOLUME_UNIT	The unit of measure that corresponds to the final volume.	Text(15)		
58	PREP_BATCH_ID	ID for unique prep batch.	Text(15)		
59	ANALYSIS_BATCH_ID	ID for unique analysis batch.	Text(50)		

Hudson River Baseline Monitoring Program
 USEPA Fish Database Export Dictionary

COMPOSITES (Data for individual fish in composite samples)

#	Attribute Name	Description	Data Type (Size)	Units	Notes
1	FIELD_SAMPLE_ID	Sample ID for unique composite sample. Used to link individual fish in a composite with the composite information in the DESCRIPTION and Results tables.	Text(50)		
2	INDIVIDUAL_ID	ID of individual fish in composite.	Long Integer		
3	SPECIES	NYSDEC abbreviations for species of fish sample.	Text(50)		
4	SEX	Sex of individual fish sample.	Text(50)		M: male F: female U: unknown
5	AGE	Age of individual fish	Long Integer		
6	TOTAL_LENGTH_MM	Total length of fish sample for individuals (nearest mm).	Long Integer	mm	
7	WEIGHT_G	Total weight of fish sample for individuals (nearest 0.1 grams).	Single	g	
8	PREP	Indicates type of sample collected.	Text(50)		“fillet” or “whole body”
9	REMARKS	General comments or field observations at time of sample collection.	Text(255)		

Hudson River Baseline Monitoring Program
USEPA Water Database Export Dictionary

LOCATIONS

#	Attribute Name	Attribute Definition	Data Type	Units	Notes
1	FIELD_SAMPLE_ID	Unique field sample ID.	Text(50)		Example: "RTN-040609-L1-C01"
2	LOCATION_NAME	Name of sampling location (e.g., Stillwater).	Text(30)		
3	PARENT_SAMPLE_ID	Blank for normal field samples. The value of "FIELD_SAMPLE_ID" that uniquely identifies the sample that was the source of this sample.	Text(50)		
4	PARTITION_PARENT_SAMPLE_ID	Field sample ID of parent sample for particulate / dissolved phase study samples.	Text(30)		
5	SAMPLE_MATRIX_CODE	Code which distinguishes between different types of sample matrix.	Text(50)		D: dissolved filtrate R: filter residue W: whole water sample
6	SAMPLE_TYPE_CODE	Code which distinguishes between different types of samples.	Text(50)		ENV: environmental sample DUP: duplicate sample FDBL: field blank
7	SAMPLE_SOURCE	This field identifies where the sample came from.	Text(10)		"Field" or "Lab"
8	SAMPLE_DATE_TIME	Date and time sample was collected.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM
9	CHAIN_OF_CUSTODY	Chain of custody identifier.	Text(50)		
10	SAMPLER_INITIALS	Initials of sample collection personnel.	Text(50)		
11	SAMPLE_ARCHIVED	Indicates if a sample was archived.	Text(50)		"Yes" or "No"
12	EPA_SPLIT	Indicates if the sample was chosen as a split by the USEPA.	Text(50)		"Yes" or "No"
13	SAMPLE_TYPE	Indicates type of water sample collected.	Text(20)		"TRANSECT COMPOSITE", "CENTER CHANNEL", or "E-W COMPOSITE"
14	COMMENTS	General comments or field observations at time of sample collection.	Text(255)		

Hudson River Baseline Monitoring Program

USEPA Water Database Export Dictionary

#	Attribute Name	Attribute Definition	Data Type	Units	Notes
15	VOLUME	Indicates if sample is routine or high-volume sample for PCB analysis.	Text(15)		"ROUTINE" or "HIGH VOLUME"
16	T1	Distance from 0 (west shore) for EDI location 1.	Long Integer	ft	
17	T2	Distance from 0 (west shore) for EDI location 2.	Long Integer	ft	
18	T3	Distance from 0 (west shore) for EDI location 3.	Long Integer	ft	
19	T4	Distance from 0 (west shore) for EDI location 4.	Long Integer	ft	
20	T5	Distance from 0 (west shore) for EDI location 5.	Long Integer	ft	
21	T6	Distance from 0 (west shore) for EDI location 6.	Long Integer	ft	

Hudson River Baseline Monitoring Program
USEPA Water Database Export Dictionary

SWQ – Surface Water Quality Data

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
1	TRANSECT_POINT	Transect number at which the surface water quality measurements were taken.	Long Integer		
2	FIELD_SAMPLE_ID	Field sample ID from LOCATIONS table corresponding to transect point.	Text(50)		
3	TRANSECT_SAMPLE_ID	Unique identifier for each location transect number. ID's for duplicate measurements end with "D".	Text(50)		Example: "RTN-040609-WF-T01"
4	DATE_TIME	Date and time water quality information was measured.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM
5	SPCOND	Specific conductivity of water.	Single	mS/cm	
6	TEMP	Water temperature.	Single	Degrees Celsius	
7	TURB	Turbidity.	Single	NTU	
8	PH	pH of water.	Single		
9	D_O	Dissolved oxygen concentration.	Single	mg/L	
10	DEPTH	Depth from water surface that water quality information was measured.	Single	ft	
11	NOTES	General comments regarding surface water quality data.	Text(255)		

Hudson River Baseline Monitoring Program

USEPA Water Database Export Dictionary

RESULTS PCBs and RESULTS_NONPCBs

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
1	FIELD_SAMPLE_ID	Unique field sample ID.	Text(50)		Example: "RTN-040609-L1-C01"
2	LAB_SAMPLE_ID	Laboratory sample identifier.	Text(60)		
3	SAMPLE_TYPE_CODE	Code which distinguishes between different types of sample.	Text(25)		ENV: environmental sample DUP: duplicate sample FDBL: field blank MB: method blank LCS: laboratory control sample MS: matrix spike MSD: matrix spike duplicate
4	SAMPLE_MATRIX_CODE	Code which distinguishes between different types of sample matrix.	Text(25)		W: whole water sample D: dissolved filtrate R: filter residue
5	SAMPLE_SOURCE	This field identifies where the sample came from.	Text(10)		"Field" or "Lab"
6	SAMPLE_COMMENT	Sample comments as necessary.	Text(255)		
7	LAB_ANALYTICAL_METHOD	Laboratory analytical method name or description.	Text(50)		
8	ANALYSIS_DATE_TIME	Date of sample analysis.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM
9	TOTAL_OR DISSOLVED	"T" for total (metal) concentration, "D" for dissolved or filtered (metal) concentration, or "N" for organic (or other) constituents for which neither "total" nor "dissolved" is applicable.	Text(1)		"T", "D", or "N"
10	COLUMN_NUMBER	"1C" for first column analyses, "2C" for second column analyses, or "NA" for analyses for which neither "1C" nor "2C" is applicable.	Text(5)		"1C", "2C", or "NA"
11	TEST_TYPE	Type of test.	Text(20)		"initial", "reextract", or "reanalysis".
12	CAS_RN	Chemical Abstracts Registry Number for the parameter if available.	Text(20)		
13	PARAMETER	Chemical name.	Text(60)		
14	RESULT_VALUE	Analytical result.	Double		Blank for non-detects.

Hudson River Baseline Monitoring Program

USEPA Water Database Export Dictionary

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
15	RESULT_ERROR_DELTA	Error range applicable to the result value.	Double		
16	RESULT_TYPE_CODE	"TRG" for a target or regular result, and "SUR" for surrogates.	Text(10)		"TRG" or "SUR"
17	REPORTABLE_RESULT	"Yes" for results which are considered to be reportable, or "No" for non-reportable results.	Text(10)		"Yes" or "No"
18	DETECT_FLAG	"Y" for detected analytes or "N" for non-detects.	Text(3)		"Y" or "N"
19	QC_LEVEL	Status of data quality review.	Text(50)		"Verified" or "Validated"
20	RESULT_QUALIFIERS	Qualifiers assigned to samples during data verification/validation.	Text(50)		
21	ORGANIC_YN	"Y" for organic constituents or "N" for inorganic constituents.	Text(3)		"Y" or "N"
22	MDL	Method detection limit.	Double		
23	RL	Detection limit that reflects conditions such as dilution factors and moisture content.	Double		
24	QL	Concentration level above which results can be quantified with confidence.	Double		
25	RESULT_UNIT	Units of measurement for the result.	Text(15)		
26	DETECTION_LIMIT_UNIT	Units of measurement for the detection limit(s).	Text(15)		
27	RESULT_COMMENT	Result specific comments.	Text(255)		
28	QC_ORIGINAL_CONC	The concentration of the analyte in the original (unspiked) sample.	Double		
29	QC_SPIKE_ADDED	The concentration of the analyte added to the original sample.	Double		
30	QC_SPIKE_MEASURED	The measured concentration of the analyte.	Double		
31	QC_SPIKE_RECOVERY	The percent recovery calculated.	Double		
32	QC_DUP_ORIGINAL_CONC	The concentration of the analyte in the original sample.	Double		
33	QC_DUP_SPIKE_ADDED	The concentration of the analyte added to the original sample.	Double		

Hudson River Baseline Monitoring Program

USEPA Water Database Export Dictionary

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
34	QC_DUP_SPIKE_MEASURED	The measured concentration of the analyte in the duplicate (for background corrected matrix spike duplicates).	Double		
35	QC_DUP_SPIKE_RECOVERY	The duplicate percent recovery calculated.	Double		
36	QC_RPD	The relative percent difference calculated.	Double		
37	QC_SPIKE_LCL	Lower control limit for spike recovery.	Double		
38	QC_SPIKE_UCL	Upper control limit for spike recovery.	Double		
39	QC_RPD_CL	Relative percent difference control limit.	Double		
40	QC_SPIKE_STATUS	Indicates whether the spike recovery was within control limits. The "*" character indicates failure; otherwise blank.	Text(20)		
41	QC_DUP_SPIKE_STATUS	Indicates whether the duplicate spike recovery was within control limits. The "*" character indicates failure; otherwise blank.	Text(20)		
42	QC_RPD_STATUS	Indicates whether the relative percent difference was within control limits. The "*" character indicates failure; otherwise blank.	Text(20)		
43	LAB_MATRIX_CODE	Code which distinguishes between different types of lab sample matrix.	Text(10)		"W"
44	ANALYSIS_LOCATION	"FI" for field instrument or probe, "FL" for mobile field laboratory analysis, or "LB" for fixed-based laboratory analysis.	Text(2)		"FI", "FL", or "LB"
45	BASIS	"Wet" for wet-weight basis reporting, "Dry" for dry-weight basis reporting, or "NA" for tests for which this distinction is not applicable.	Text(10)		"Wet", "Dry" or "NA"
46	DILUTION_FACTOR	Effective test dilution factor.	Double		
47	PREP_METHOD	Laboratory sample preparation method name or description.	Text(50)		
48	PREP_DATE_TIME	Date of sample preparation.	Text(255)		MM/DD/YYYY HH:MM:SS AMPM

Hudson River Baseline Monitoring Program
USEPA Water Database Export Dictionary

#	Attribute Name	Attribute Definition	Data Type (Size)	Units	Notes
49	LAB_NAME_CODE	Unique identifier of the laboratory.	Text(15)		
50	DATA_PACKAGE_LEVEL	Data package level.	Text(10)		“A”, “B”, or “AB”
51	PERCENT_MOISTURE	Percent moisture of the sample portion used in this test.	Double		
52	SUBSAMPLE_AMOUNT	Amount of original sample used in sample preparation.	Double		
53	SUBSAMPLE_AMOUNT_UNIT	Unit of measurement for subsample amount.	Text(15)		
54	SAMPLE_DELIVERY_GROUP	Sample delivery group.	Text(20)		
55	TEST_COMMENT	Comments about the test as necessary.	Text(255)		
56	FINAL_VOLUME	The final amount/volume of the sample, extract, or digestate after sample preparation.	Double		
57	FINAL_VOLUME_UNIT	The unit of measure that corresponds to the final volume.	Text(15)		
58	PREP_BATCH_ID	ID for unique prep batch.	Text(50)		
59	ANALYSIS_BATCH_ID	ID for unique analysis batch.	Text(50)		